Attachment to Nature: the Roots of Environmentalism

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Declaration of Authorship

I, the undersigned, hereby declare that this thesis is my own work and that it has not been submitted for any degree or professional qualification at any other institute of tertiary education.

Information derived from the published or unpublished work of others is acknowledged in the text and a full list of references is incorporated.

Brendan Hill

Dated

Dedication

This project has without doubt been the most arduous I have faced, a labour of love of which I repeatedly despaired, whose conclusion was unimaginable without the tireless personal support of many friends, colleagues and my parents. I have attempted to acknowledge their part elsewhere, hoping the end result justifies if only to some small extent their faith in me. However there are four special people in particular to whom I dedicate it, for all of whom I was the first of their next generation: my grandparents.

For unrepayable years of honest toil in hard times and good, for unimaginable bravery in all our names, and for long and full lives of unquestioning service, dedication and love to your families and to others, this thesis is for:

Annie Bonney

William Bonney

Mary Ellen Hill

Samuel Hill

of St. Helens, Lancashire, England.

Overview and Chapter Summary

The goal of this thesis is to throw light on the origins of our attitudes to nature. Within this overarching theme, the aims are to enhance the study of environmentalism with a conceptually coherent and empirically testable psychological basis, to investigate evidence for developmental influences on environmental attitudes, and to examine the implications of such a theoretical investigation for practical applications.

Chapter 1: Introduction: Narcissism, agency and the 'environmental' 'crisis' 1

This chapter is a personal essay outlining the train of thought which led to the question asked by this thesis: What are the fundamental influences on our attitudes to nature? Moreover, it suggests why such attitudes might be important as both an intellectual enquiry and a factor in quality of life. It ends with a short confessional on the author's own influences.

Chapter 2: Literature review: Evolution and ontogeny of the self in relation to nature..
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Humans interact with their environments in ways ranging from the physiologically evolved to the culturally complex, out of which 'self' arises. This chapter extends the traditional view of self as interpersonal to review the evidence for self in relation to the non-human. In particular it examines the mounting evidence for the importance of nature to the self through the lens of perhaps the most successful theory of self-in-relationship, Attachment Theory.

Chapter 3: Literature review: Attitudes and behaviours toward nature 75

Attitudes and behaviours are the subject of much psychological investigation and theorising. This chapter describes how this work impinges on our thoughts and actions in relation to nature, and how authors interested in these questions have characterised the variety of attitudes people hold.

Chapter 4: Questions arising and hypotheses for investigation 99

This short chapter summarises the main unanswered questions thrown up by the literature review and proposes a multifactorial, developmental model for the origination of environmental attitudes and behaviour. A series of seven testable hypotheses arising from this model are stated.

Chapter 5: Methodology 103

This chapter systematically considers the possible sources and means of gathering data for relevance and practicality. It concludes that an extensive questionnaire administered to a wide range of target groups is most suitable. It explains in detail how the instrument was constructed and how the data gathering and processing work was carried out.

Chapter 6: Analysis of major hypotheses 155

The three 'major' hypotheses are tested against the data. Statistical conclusions about the significance of the various relationships are summarised by individual hypothesis.

Chapter 7: Analysis of minor hypotheses..... 201

The four 'minor' hypotheses are tested against the data. Statistical conclusions about the significance of the various relationships are summarised at the end of the chapter.

Chapter 8: Discussion: Hypotheses and results 237

The hypotheses and the results relevant to them are in turn summarised and discussed. Where patterns arising from multiple results are evident they are identified, and speculations about what this might imply for the relationship between childhood experience and adult attitudes are made.

Chapter 9: Discussion: Childhood, attachment and environmentalism 259

Discussion moves on from the specific hypotheses to how the larger picture emerging from this investigation might be characterised. Based on the new empirical evidence, seven specific arguments are proposed. Finally, a number of novel theoretical proposals are mooted which have particular relevance for accepted theories of attachment and environmentalism.

Chapter 10: Consequences, applications and further research..... 290

This final coda considers some of the wider practical implications of the progressive diminution of direct contact with nature. A conceptual framework for understanding the deterioration and potential improvement of human-nature relations is proposed, and a series of possible interventions and further research questions is identified.

Chapter 11: Appendices..... 309

The full questionnaire instrument as deployed and the most important statistical results tables are reproduced. Supplementary statistical tables are included on a CD-ROM.

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I should – as the joke runs – not have started this journey where I did. With the benefit of hindsight I could have chosen an easier task than to attempt a thesis in an under explored area in which I had little expertise, and to pursue it while working concurrently in demanding jobs. I could and probably should have gone about it in a more disciplined fashion and would in all likelihood have concluded it more rapidly, rather than the wandering, serendipitous and glacial manner I have done. But whilst it has had its downsides, as in so many things, the process has proven itself to be as important as the product: it has been a baptism of fire, a befuddling maze, an apprenticeship of elephantine gestation, a motivational test par excellence peppered with drowning feelings and, occasionally, elation.

Though I have not answered *all* the questions I set, I feel I *have* done the original conception justice, *and* discovered many potential enquiries I had not imagined. I am the better for it: I only hope that in the fine tradition of the academy the half-dozen people who get to read the average PhD find some part of these labours of benefit to their enquiries.

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Abstract

‘Attachment to Nature’: the root of environmentalism?

Brendan Hill February 2003

Attitudes to nature vary between individuals, between cultures and over history. Human behaviour towards nature varies similarly and crudely can be characterised as ‘abusive’, ‘indifferent’ or ‘caring’. Attitudes in western societies currently appear to be more pro-environmental, yet the actual collective behaviour of humanity is unsustainable, potentially threatening our survival. Investigations into the epigenesis of pro-environmental behaviours are few, qualitative, and mainly study environmental educators. Potential antecedents to such behaviour are suggested to include ‘experiences of nature’, adult instruction, and both formal and informal education. In comparison, the antecedents of interpersonal pro-social patterns are increasingly well understood as a result of systematic psychological research: the emotional and motivational qualities of an attachment with the ‘primary caregiver’ (principally parental ‘attachment status’) have been demonstrated to make enduring prototypes for the qualities of other, later, relationships.

In this study, a comprehensive, retrospective questionnaire, covering the environment and behaviour of childhood, parent-child relations, and the behaviour of parents in relation to the environment, as well as the present attitudes and behaviour toward nature of the respondent, was completed by 294 adult subjects from a variety of ‘nature relevant’ occupations including Biotechnologists, Conservation Bureaucrats, ‘Ecoradicals’, Students, Farmers and Foresters. Factor analysis demonstrated a modest correspondence between attachment to parents and behaviour toward nature, and showed that people do replicate certain parental environmental behaviours. However, much more potent antecedents of pro-environmental attitudes and behaviours emerged. These were: unconstrained childhood exploration of nature, and modelling of easy familiarity with nature by a ‘nature mentor’, usually a parent. Vicarious experiences of nature, as from broadcast media, also appeared positively to influence attitudes and behaviour, but they result in a more ‘objectified’, less motivated, relationship, and were not a substitute for direct experience. Vocational choice was influenced by childhood nature experience.

It is concluded that environmentalism may usefully be considered as composed of dimensions or components of three kinds: emotional, behavioural and cognitive. An emotionally secure relationship with nature, here termed ‘Attachment to Nature’, is hypothesised to be the most significant factor in the generation of committed pro-environmentalism, and a comparison to parent-child attachment theory is made. Outdoor recreation behaviour may prove to be a measure of this nature attachment, comparable with the ‘strange situation’ test of infants for parental attachment. As poor interhuman attachment is implicated in chaotic and abusive relationships, wider emotional and behavioural effects of separation from nature are probable, and may prefigure behavioural pathologies analogous to dissociative disorders, depression and violence. This remains to be rigorously investigated, as do detailed pathways to particular environmental values and behaviours for different personality types. The loss of access to the non-human inherent in the global tide of urbanisation may have long-term psychological costs, implying psycho-social sequelae significant for health, architectural, town planning, transport and economic policies. An ‘ecopsychological’ model of the present erosion and potential restoration of individual and collective psychological health in relation to nature is presented.

Chapter 1: Introduction: Narcissism, agency and the 'environmental' 'crisis'

'I am at two with nature'

Woody Allen

1.1 The human-nature relationship is an urgent and neglected subject of investigation

It is a fundamental *and alienated* error of categorisation to suggest that nature is without sentience.

Borne of particular historic and cultural circumstance and an in other ways triumphant Renaissance climate of ideas, this view led western civilisation on a centuries-long detour from truth about non-human nature. Whilst not without its obvious benefits in other areas, the notion that humans and humans alone feel, think, experience, suffer, remember, communicate, reflect, plan and act on the basis of inner motivations has not only served as a constant reminder to the majority of the lack of common sense of much of the intelligentsia, it is also a piece of dogmatic denial which is now, by the academy's own standards, being revealed as lacking clothing. Which is not to say it is not still rife.

Though behaviourism was indeed a twentieth century peccadillo, it was *my* Greatest Briton Ever[1], dear old Charles Darwin, who half a century before really struck the fatal blow to simplistic Cartesianism. If the 'wise, wise ape' is merely a beautiful, evanescent pattern on the surface of a river of time driven by deeper but largely comprehensible currents, the argument can no longer be whether that which is not human in the natural world (henceforth generally referred to as 'nature') possesses a degree of consciousness, but whether

[1] As this thesis was being finalised the BBC held a competition to elect the UK public's 'Greatest Ever Briton'. Perhaps understandably, but in this author's view unfortunately, instead of Darwin, Newton or Shakespeare, Churchill won.

consciousness is expressed as a hierarchy or as a pervasive quality of all living (some would say *all*) things.

Though many questions, including that one, are probably unanswerable, Darwin and Wallace's idea is the most significant the human mind has produced because it collapsed the knottiest problem of theology, natural history and the yet-unnamed discipline of psychology into an abstruse philosophical curio. Simultaneously, it demoted God and forced our reluctant species into a new phase of self-realisation. Perfectly conforming to Campbell's hero myth archetype (Campbell 1988/1949), this multimillennial journey from the Garden of Eden ends as it began, standing at the threshold. This time, the same but different, glancing both ways, we finally see that outside is the same as inside. We are but one phenomenon of a unified natural order.

Almost all cultures have almost always seen the non-human as, to varying degrees, sentient. It could not have been otherwise. Why? Because first hand experience of living, dynamic, responsive nature has always been the norm: and when you feel it, you know it. Now, at the beginning of the twenty-first century, for the first time, more than half of all people live in human-created, urban environments (Norton 2001), distanced from nature.

This is news of much more than 'academic' interest. Living in cities changes us, deeply. All historical civilisations (which means 'citied') of which we are aware collapsed traumatically (Ponting 1993). In modern parlance, and by the test of time, they were unsustainable. Can ours escape this fate? Probably not. Something about large settlements holds the seeds of their own destruction.

Though dozens of candidates have been advanced for what those seeds might consist of, popular among them the dawn of self-consciousness (Jaynes 1993), the realisation of the possibility of hierarchy (Bookchin 1980), the invention of the alphabet (Abram 1996), the beginnings of agriculture, the specialisation of labour, technological advancement, population overgrowth (Ehrlich 1970; Ehrlich and Ehrlich 1990), non-renewable energy consumption, the industrialisation of food production (Green 1978), resource exhaustion and excess mobility, this thesis proceeds on the Gordian knot-slicing logic that the underlying problem has to be the attenuation of a negative feedback loop. As cyberneticists know, understanding and correcting the dynamics of one simple loop can be pivotal in changing the trajectory of a whole system.

Living close to nature is a relationship and, if interactions with living things do nothing else, they give us feedback on the consequences of our behaviour. Nature in its widest sense is ubiquitous: however much we construct insulated human worlds, they arise from, are built of, and are contained within, nature. We are in and of it, and we are consumingly interested

in it. Irrespective of our likely collective fate, it is therefore valid and interesting in and of itself to investigate and understand the human-nature relationship: from whence our motivations for behaviour toward nature arise, how they are put into effect, and indeed how the non-human behaves or chooses to behave toward us.

Knowing that this understanding might considerably delay our inevitable extinction – or at least that of the project of industrial civilisation - just makes it a little bit *more* interesting.

1.2 In our ignorance we threaten our existence and much else

For those of us interested in studying the human-nature relationship, there's a problem that is impossible to overstate: even whilst we ponder and plan our investigations, the non-human world is disappearing irretrievably from under our feet.

It is here taken as read that, however awry the short-term (i.e. decades) forecasts of rates and timescales, we are in the midst of a fourth great extinction episode. Degradation of nature on such a scale has never occurred during the existence of our species. Mainstream global scientific, institutional and nongovernmental opinion concurs that soils, fisheries, forests, and biodiversity in general are being eroded at exceptional rates, leading to unprecedented ecosystem brittleness; that the normal life span of species – enormous in human life span terms - is being curtailed, and; that the climate itself is in a state of flux, threatening unpredictable and chaotic change (Brown, Flavin et al. 1999; United Nations Environment Programme 1999; World Resources Institute, United Nations Development Programme et al. 2000). Even the conservative world of academic scientific orthodoxy has felt driven to issue a unique Warning to Humanity[2], essentially telling us that as far as our reliance on nature is concerned, the candle is being burnt at both ends, and quite possibly in the middle too (Union of Concerned Scientists 1992). Recent suggestions that some environmental indices are actually improving (Lomborg 2001) are not necessarily at odds with this larger pessimistic description, although they are contentious and dismissed as unworthy of serious refutation by UNEP staff (Manoochehri 2002). The inexorable deterioration of our quality of life, never mind that of other species, has begun in earnest.

[2] Over 1,700 members of science academies including a majority of scientific Nobel laureates signed the World Scientists Warning to Humanity, representing 69 nations including the 12 most populous and the 19 largest economic powers.

While there will be regional gains and losses, globally our children are unlikely to have it better than we did.

It is clear that the academy overall, still less society, is either unwilling or unable to act appropriately on the gravity of this information. For example, the American Academy of Pediatrics (2002), perhaps the leading authority on child health, whilst advising the responsible parents of America on what to do about vaccines, 'disasters', skin problems, car safety seats, obesity and sports injuries, deems this surely overarching threat not worthy of serious mention in a recent 'Kids' Health' supplement with a national newspaper. The metaphor of sleepwalking has been suggested. (This is perhaps a *little* unfair. Some psychologists acknowledge the issues: 'Enormous changes to human lifestyles and cultural practices may be required … This article discusses major obstacles … and proposes that we should view the achievement of sustainable living patterns as a superordinate goal …' (Oskamp 2000).)

So why are we in this state? What's causing it? To cut a very long story very short, the irony is that the single greatest agent of this slow motion carnage is us. Environmentalists of the early nineteen seventies were by no means the first to note our capacity for voracious destruction: two and a half Millennia ago, Plato (1971) did. Our recent difficulty has been to accept that our collective impact can have more than *local* effects. With the advent of international treaties on global warming, it seems we finally have.

It is not, as many used to have it, primarily the weight of human numbers that is the problem, undesirable though that may be. It is what we do while we are here. Carrying capacity may not be infinitely expandable, but what a north American child born today will probably consume in their life would sustain dozens of Indian children. But there are only three Indians for each American. Abstemious vegetarian pedestrians who live in shacks near the equator and eat local food may be materially poor, but they are certainly not the root problem (and they are not necessarily unhappy either). It is in fact a subset of humanity – the global 'consumer class' in the affluent industrial west, and increasingly on the Pacific Rim (Durning 1992) - whose historically cornucopian lifestyle both consumes most resources and drives others to do so, through striving to supply resources, a desire to 'catch up', or simply by undermining traditional life ways. To economists in particular, this is not an uncontentious analysis: I make no apology that it is an unremarkable ecological one. And remember, economics cannot happen outside ecology.

So we have found our villain: industrialism. Not so fast. Even in the midst of modern, highly technologised societies, resource consumption varies enormously. An array of factors matter: is your house energy efficient; where does your food come from and how is it

produced; are you a ‘repairer’ or a ‘replacer’; what do you throw away, and how? For the peasant farmer, environmental sustainability may primarily be a matter of sensitivity to signs there to be seen by caring eyes, but for the urban dweller at sea in consumer society, it is a matter of sifting a deluge of contradictory abstract information, understanding and believing the right messages, and being motivated to act appropriately in decision after decision. In short, whilst technology can offer up partial solutions, the final step is behavioural. Luckily, most people in western societies nowadays understand, believe and know what they should be doing (Kempton, Boster et al. 1995). The problem is that they do not do it.

Hence the crux of the problem at one level at least is turning good intentions into action. (Setting aside the debate about whether people are generally free to do so, which is a rather large assumption and is clearly not universally true when examined in depth – for example poverty obviously has its constraints in certain circumstances; but for the purposes of argument, we will work with it for now.)

In fact, the great majority of people in north America, as well as other affluent nations and some beyond, now consider themselves environmentalists. There has been a strong movement over the last generation toward espousing such values: at the turn of the 1990s, 41 percent of Americans considered themselves ‘strong environmentalists’, 35 percent said they were (not strong) ‘environmentalists’ and only 20 percent said they were ‘not an environmentalist.’ (Gallup Report 1989). Eighty-five percent said they worried about the loss of natural habitat a ‘fair amount’ to a ‘great deal’. There have been similar findings worldwide (Gallup International 1992). Pro-environmental attitudes have recently been at their highest ever levels (Dunlap 1991; Noe and Snow 1990; Wall 1995) such that public concern for the environment has now been termed a ‘cultural constant or norm’ (Derksen and Gartrell 1993).

Given that the rhetoric of environmentalism is now as lauded as motherhood and apple pie – who could possibly be against it? - across the spectrum of society, which people actually walk their talk and change their behaviour for environmental reasons, and what distinguishes them from others? They may not look any different, but they can be identified: it’s those with ecocentric values (Thompson and Barton 1994). So, finally, the question is: what leads to ecocentric values?

> *‘Why isn’t everyone an environmentalist? Why do some people care more about the future of the natural world than others do? Why do some people actively protect nature while others, by indifference or intent, are prepared to see it destroyed? These questions, in some form or other, constantly puzzle those*

engaged in campaigning, negotiating and lobbying for a more environmentally benign society.' (Milton 2002, 1)

Well, this is a study in psychology, so it will not be a surprise to learn that:

'... the ecological crisis is a crisis of maladaptive behavior. Thus, the problem falls squarely in the domain of psychology. Ultimately, the solution lies with the sciences that deal with changing human behavior'. (Maloney and Ward 1973, 583)

1.3 Psychology has largely ignored and denied consciousness of nature

An alien trying to understand human existence through the lens of current psychological teaching and study would be forgiven for concluding that the non-human is an insignificant phenomenon.

A century of psychology as a discipline has focused almost exclusively on what happens within and between humans and has virtually ignored the non- or 'more-than' human (Abram 1996) world with the notable although utilitarian exception of using, some say abusing, animals as models through which to develop a better understanding of human minds. Strikingly even psychotherapy, aspiring to address personal and in some models collective problems of 'adjustment', has been declared to have failed (Hillman and Ventura 1993). Non-human and even beyond-the-interpersonal social issues such as politics and economics have effectively been taboo to most schools. Too often the client who confesses how meaningful they find an outer-world issue has (unintentionally) been belittled by the therapist who enquires exclusively about what this concern says about them.

That the pre-eminence of these assumptions has occurred during the period of fastest growth in human population and the most rapid phase of conversion of hitherto gift-economy exchanges into monetised transactions is perhaps not coincidental. In encouraging this flight to the inner life of people experiencing psychic discomfiture psychotherapy, it has been suggested, has bled public discourse of quality and absorbed into futile introspection enthusiasm that could usefully have been poured into addressing societal issues. Hence the book title: 'We've had a hundred years of psychotherapy and the world's getting worse.'

(Hillman, James and Michael 1993) In essence, the accusation is that psychology in general and psychotherapy in particular have in the main been the handmaidens not of capitalism but of the even more fundamental industrial machine.

1.4 The psychology that does acknowledge nature is marginal

Not one undergraduate general psychology textbook I have encountered makes more than minor reference to the environment as a psychologically salient dimension of experience. Those that do tend to consider 'environmental psychology' a derivative of social psychology (with perhaps a seasoning of behaviourism thrown in), interesting in the context of natural disasters or because someone wants to manipulate people into doing more recycling. This is in my view *wildly* disproportionate verging on the perverse, for several reasons. First, to a first approximation, human history has been played out in small wandering bands, *in* nature: if you accept that an animal's habitat is the major force of evolution, then who we are now has to be closely attuned to the savannahs on which we speciated. Second, to put it colloquially, city folks write city psychology. But the city is an historical aberration, ergo the norm for baseline studies of human psychology ought not to be urban living. Thirdly, despite the insulated, seasonless, anthrophilic surroundings we have built for ourselves, nature is ineradicable: rats, meat, dirt, fire, foxes, snowdrops and snow. Even for kids in the concrete jungle, it cannot help but be significant.

Psychology's response? Even in the early 1970's the most mainstream answer was declared to be misconceived. 'Ecological psychology' (by which it seems fair to assume the authors intended what we now know as environmental psychology, rather than the perceptual version of ecological psychology) was accused of being defined too narrowly, 'in terms of studying the effect of qualities of the environment on man's behavior, while the effect of man's behavior on the environment has been relatively ignored. Combining the 'experimental model' and the interest in the environment's effect on behavior, ecological psychology has tended to become a somewhat remote and peripheral pursuit that is not dealing directly with an immediate solution to the crisis.' (Maloney and Ward 1973)

Given this trenchant criticism of academic psychology, this thesis is obviously open to the accusation that it itself perpetuates the anthropocentric, individualistic prejudice both of psychology itself and of the advanced industrial societies within which the discipline has primarily arisen. In choosing to study the ontogeny of individual environmental behaviour, however, any fair reading would accept that the impact on the child of influences beyond

close relationships is within the scope of the work. What are excluded here are sociological, political and economic analyses of how (psychologically) things come to be the way they are, and how they might be changed. Apart from the impracticality of incorporating such diverse perspectives, it is this author's considered judgment (and hope!) that – given the richness and interdisciplinary connectedness of attachment theory and environmentalism - others will engage with and critique this work, and the theoretical innovations proposed, in publications that arise.

1.5 Establishing a basis for human-nature relationships?

As someone who came late to academic psychology, my interest was to establish, or at least strengthen, a secure foundation for primary human-nature relations in accepted theory. As such, the approach is pragmatically motivated: What in the individual's experience most significantly shapes environmental attitudes and behaviour? If the question was clear, the means of approach was not: Which theoretical framework is most likely to provide a testable model of the fundamentals of our behaviour toward the non-human? Upon which criteria should such a theory be selected?

It had to be widely accepted, authoritative and with a methodological repertoire affording practical possibilities for a useful single-person study. It had to, for the purposes of demonstrating scientific credibility (for this is where the evidence is truly lacking), offer the possibility of falsifiable hypotheses. It had to take account of previous work that had not convincingly addressed the central questions, and note which areas previous investigators had perhaps overlooked for answers. Cognitive and information-driven approaches seemed to fail to capture motivational qualities that were the crux of this investigation; sociological and social psychological accounts were already plentiful, but largely steered clear of developmental issues and were therefore unsatisfactory; and psychoanalytic models, though having potential explanatory power, were not disconfirmable.

Fortunately (being originally a zoologist), the one theory that bridges ethology and psychodynamics, attachment theory (to be explained in more detail later), was suggested to me early on. Using this framework, it seemed possible to ask testable questions about the formation of basic relational bonds with nature which feed into personality factors and interpersonal behaviour.

1.6 Why me, here, now

All research is performed by emotional, sentient beings with a history, a culture and a trajectory, and it is only fitting given the theoretical orientation of this work briefly to sketch where I am from, and how I got here.

Though born in an archetypal northern English industrial town (literally so, as the subject of an eponymous documentary book (Forman 1979)) it was an age of relative innocence, the early nineteen sixties. For my first four years we lived in a suburb adjoining industrial waste ground, thence moved to a classier area where our back garden fence was the end of the town and the beginning of farmland (where I still, metaphorically, play). Though I ranged away from houses in the first home, memories of it – cycling a treasured tricycle down the middle of the (traffic free) street - are largely urban and vaguer than the second where, alone or in a gang, I happily wandered for hours and miles through fields and woods, never wanting for stimulation. My father was abroad a lot, building glass production factories, but being the eldest grandchild of two large extended families I was seldom involuntarily alone.

In attachment theory terms (which will make sense as you read on) I predictably score high on care and above average on overprotection. In time I made my own way to school, walking and bussing, ever the inquisitive hound sniffing around bushes and back ways. Yes, we were a dog family and yes, I was an avid watcher of natural history television. My parents, lovers of the Lake District, began taking my brother and I for regular camping weekends across Lancashire and beyond on slutchy (local dialect for *very* muddy – think of the sound when you pull an engulfed boot out of a deep mire) fields with a group of like-minded families: I liked to pitch my own pup tent and pretend independence.

At sixteen, with two equally naïve fellows, I determinedly hoisted a barely liftable rucksack to backpack three weeks down England's 'wild' backbone, the Pennine Way. Around then, after my first ecopolitical meeting, I remember telling the friend that asked me along that I could not find fault in the argument that industrial society as then orientated seemed ultimately incompatible with the laws of nature. Though I have not been particularly politically active since, I did study zoology, work in the fascinating but cut-throat world of broadcast media, travel the globe and have been fortunate enough to witness almost all the world's major ecosystems. Fast forward two decades and my friend directs a conservation organisation: I have chosen to spend more time and energy than I have devoted to any other challenge wondering why other people don't regard nature as highly as I do.

Perhaps I answered my own question already.

Chapter 2: Literature review: Evolution and ontogeny of the self in relation to nature

> *'Beneath the veneer of civilization, to paraphrase the trite phrase of humanism, lies not the barbarian and animal, but the human in us who knows the rightness of birth in gentle surroundings, the necessity of a rich non-human environment, play at being animals, the discipline of natural history, juvenile tasks with simple tools, the expressive arts of receiving food as a spiritual gift rather than as a product, the cultivation of metaphorical significance of natural phenomena of all kind...There is a secret person undamaged in every individual, aware of the validity of these, sensitive to their right moments in our lives....'*
>
> Paul Shepard, Nature and Madness (1982, 129)

This chapter reviews the literature pertaining to the formation of the self in relation to non-human nature, gravitating in particular to the extensive body of 'attachment' research concerning relations with other humans, and as more latterly extended to include other objects.

Central to this chapter is Attachment Theory, the most widely employed and investigated framework for understanding the establishment of interpersonal relationships. Originally it simply held that young humans have evolved predispositions to seek parental proximity and hence safety and that, where these are not satisfied, insecurity results. Confirmatory work demonstrated that the emotional dynamics of infants' interactions establish enduring patterns of relationship that predictably affect personality, mental health and life success. Experience with the primary caregiver is most salient but other relationships are important, have reciprocal effects and can significantly compensate for poor primary relationships. No quantitative work has addressed attachment as a universal quality of relations with the non-human, although relationships with pets have recently been so characterized, and geographers routinely - although in psychological terms loosely - speak of 'place attachment'. We return to the subject in much more detail in section 2.5 Attachment Theory.

2.1 Evolutionary and genetic predispositions to a dialogue with nature

Interactions with others and with the non-human environment are not just inescapable; they play a critical part in maturation of the individual. True, they function only in partnership with the phenotypic influence of genes, which pass comparatively stable underlying characteristics on to the next generation, including a capability to learn from environmental interactions. Workable genes are a necessary but insufficient condition. The environment can and does change, often rapidly, and every organism is equipped to adapt, succeeding in attaining a livable state often only at the cost of profound change in its life habits, or failing and ending at least its own existence.

Genes mutate less rapidly than societies change and environments alter: they are effectively, necessarily, less prone to variability. Set deeply in the foundations of life they betray their influence in the quiet, enduring structural commonalities across and between species, in contrast to the capricious 'daily news' agenda of human history and culture.

For the reason that this thesis sets out to throw light less on cultural factors than on an area of human-nature relations that is more likely to be relatively stable across cultures and time, the arguments that will be deployed herein will tend more to the zoological and bio-psychological than to the sociological, philosophical and political, within which most dialogue on environmentalism appears to be conducted.

This is not to deny the critical social influence, which is profound but, to use management terms, it will be to sort the strategic from the tactical. There is a dialectic between genes and environment in the ontogeny of the individual and the phylogeny of the species. It hardly makes sense to speak only of the influence of our behaviour on our environment, or the other way around, as though these two entities were merely 'flashlights shining at each other from a distance' (Hinde 1998). Environment constantly shapes behaviour shapes environment, an endless coevolutionary dance.

This dialectic also occurs from moment to moment. Each day our judgment of the sun's colour changes. Noon sunlight is rich in yellow wavelengths, and evening light is richer in red, but we perceive the light of a white object outdoors as having a constant colour. Whilst the adjustment of our sight occurs in hours, the mechanism for doing so must have evolved over an evolutionary time scale (Hinde 1998). Genes 'dialogue' with the environment over evolutionary time; the personality 'dialogues' with his or her physical, cultural, interpersonal and arguably intrapersonal surroundings in a lifetime. The distinction is therefore one of time

scales and of focus: the former necessarily obscure and almost imperceptibly slow, requiring for detection controlled comparisons of data indirectly known, the latter higher profile and rapid enough to be evident to immediate human experience.

As evidenced by misunderstandings around and politicisation of the predominantly animal-based notions of sociobiology (Segerstrale 2000; Wilson 1975), such ideas are easily caricatured without having properly grasped that they do not, as many seem to believe, 'pull the rug' from under social science: they contextualise and help delineate it and, conversely, can be qualified by what social science has learned.

I have often communicated this more nuanced understanding to students by suggesting they conceive of evolution and our individual genetic heritage as a gentle breeze from a constant direction, or a landscape of rolling hills and valleys. Individuals, groups and whole societies can exercise their freedom to move against the wind or scale the heights briefly or for (in human life span terms) considerable periods of time, but the patient inevitability of evolution will always outlast their exertions, resolve or ideology, sending them in a direction that they may never have been aware of. Human culture is a game played to rules set by evolution, on a field marked out by our genetic heritage. It necessarily follows that the *potentialities* of the mind are products of natural selection just as much as are those of the body (Barkow, Cosmides et al. 1996), although evolution is, of course, open-ended and the human 'constitution' may slowly change.

One must not make the mistake either of assuming that advocacy of natural selection and evolutionary psychology is to suggest that life is an endlessly competitive struggle of one against another, a perspective based on a misreading of Darwin's 'survival of the fittest' phrase (he, of course, meant nature and habits 'most fit' or 'appropriate' to what we now term the ecological niche). Credible arguments have been advanced to suggest that co-operation or mutual facilitation of life processes may be as important as competition at intracellular levels (Margulis 1998; Margulis and Dorion 1995) as at the interorganismal and social (Kropotkin 1987/1902). Effectively, not only does life interact with the earth's geophysiology to promote the conditions for further life (Lovelock 1979, 1989), but life as a whole co-evolved, organisms acting as a part of the environment for each other.

However, before taking up co-evolutionary arguments it is necessary to take a step back to look at more straightforward ways in which organisms in general, and humans in particular, interact with their environments.

2.2 Physical tropisms: Sensory awareness of the world

2.2.1 Light

Responsiveness to light is a primitively evolved function guiding growth in plants and movements of predation and concealment in animals. Natural light is patterned diurnally, seasonally and ecologically, and such gradations act as cues for action by living things. They also influence development. Given the remarkable precision of the organization of the visual cortex of a cat it is surprising, says Blakemore, how much of it is pre-programmed *before* the onset of visual experience: visually excited cortical neurons respond selectively to lines or edges before the eyes of a growing kitten open. Later experience serves to refine this inherited structure. Kittens reared in an environment bereft of horizontal lines fail properly to respond to those contours when older, the animal's brain structure having become biased toward the angles of lines and edges it experienced when young (Blakemore 1998, 49-51).

Children who for natural or other reasons have no sight in one eye during the sensitive period between 3-6 months usually remain with poor sight in that eye, even if the visual defect is completely corrected. Being able to see the world in light is a product of both nature, and of the seeking of experience.

2.2.2 Temperature

Whilst *sensitivity* to temperature is universal among living organisms, effects on behavioural *activity* are mainly confined to animals possessing nervous systems that enable them to move purposefully. Temperature varies along numerous topographic, ecological and temporal cycles, shaping the micro- and macro-habitual preferences of most organisms. Among higher animals, poikilothermic reptiles practice behavioural modification to make up for environmental temperature deficiencies, whilst homoiothermic birds and mammals seek to maintain a steady internal temperature through differential heat generation, insulation and in certain situations proximity to fellows.

Humans have freed themselves from dependence on such methods through learning to control external sources. As a precondition for expansion beyond the warm tropics the innovations of fire and clothing are archaic, skeletons decorated with probable remnants of clothing from at least 28,000 years ago having been identified in Russia (Mithen 1996, 175).

2.2.3 Sound

Evolved from the vibration sense of aquatic forms, hearing is exploited to serve spatial awareness, navigation and the identification of maternals and is of critical use in communication and capable of transmitting physiological effects between individuals. Music may have come about in human cultures by mimicry, as a mnemonic for animal calls and weather sounds (for example bird song, but also evident in the mimicry of natural sounds in the music of indigenous peoples, and in onomatopoeic words and phrases). The sympathy for animal sounds is related to the intrinsic panhuman sense of rhythm and melody evident in infants from birth, which patterns the communication of vital states between mother and child from before birth. 'Motherese' baby talk shows common temporal and melodic characteristics across cultures, and infants respond strongly to its rhythms and accents (Trevarthen 1999-2000). Language or speech is believed to have evolved as a means of indicating or naming animal presences, for example through alarm calls indicating the presence of a predator. Complex communication about internal states of the body and mind would have arisen gradually with increasing self-consciousness and complex purposeful behaviour (Donald 1991; Mithen 1996) and the bootstrapping effect of oral cultural transmission, perhaps punctuated by major leaps in narrative awareness (Donald 2001; Jaynes 1993). However that we retain a capacity to feel relaxed when hearing natural sounds is noteworthy, and it may be worth investigating to what extent this evaluative hearing of the world is innate or learned.

2.2.4 Odour

The sense of smell can be the principal informant for awareness of the world: certain male moths respond to very small numbers of molecules of pheromones when kilometres from a female. Chemical sensitivity is often regarded as the 'lowest' of all the senses – yet it is capable of bringing about elaborate memories. It has numerous effects on behaviour, for example to permit identification of organic food and its state of vitality or decay. Rats suckle in response to skin odour (Hofer, Shair et al. 1976). In humans, the Major Histocompatibility Complex affects how we smell to each other and has profound behavioural and even evolutionary effects, such as bringing about assortative mating. It can also lead to conditioned responses to challenging tasks (Dobson 1999). Aromatherapy capitalizes on the pharmacophysiology of smell, tellingly using almost exclusively plant essences.

2.3 Learning and instincts

2.3.1 Encountering the world: How animals learn to perceive

How do we learn about the environment? First and foremost, through exploring with our senses. It is important to distinguish between learning in the sense of a recallable memory and the more fundamental 'learning', or physical sculpting, which takes place when circuits or pathways are laid down in the brain as a result of sought-for experience. The difference cannot be absolute since the retention of any memory must involve a specific change in the brain. But at certain times in development ('sensitive periods') the brain's anatomy is more open to particular kinds of environmental experience and at other times, retention may be less 'critical' or selective. Although the mechanism by which momentary experiences are memorised remains open to investigation, certain features of mechanisms that underlie the establishment and reinforcement of sensory pathways are well understood.

In the first, prenatal phase of cortical development, genes and factors controlling gene expression in the body necessarily govern brain formation. Sense organs connect in a selective manner with brain areas. Postnatally, organisational refinement takes place controlled partly by spontaneous activity in neuron arrays and partly by nervous activity excited by input from the sense organs (Blakemore 1998, 33).

Multiple simultaneous firings of incoming nerve fibres reinforce particular pathways. The circuitry can be said to have *learned* about those coincidences by a *long term potentiation* that can last for hours, days and possibly for ever (Blakemore 1998, 52-3). The adaptive value of being able to mould, for example, one's visual system to best detect features that are present in the environment in which one grows up is obvious. This ability to learn from the environment must have occurred early in the evolution of life.

> *'...synaptic plasticity enables the brain to take advantage of information that can be provided by the pattern of sensory stimulation derived from the animal's environment, 'fine-tuning' the circuitry that has been roughly laid down on the basis of that simple cascade of genetic instructions occurring before birth.*
>
> *'In the same way, individual memories, skills, and other forms of learning in the adult animal provide the brain with representations of individual interactions with the external environment, expanding the information embedded in the brain, far*

beyond the knowledge of the world captured in the simple reflexes and reactions established by the genetically programmed initial wiring.' (Blakemore 1998, 54)

The environment and our interactions with it clearly shape our brains: and damaging effects of gross disturbances are known. Deprived or abnormal rearing can induce severely disturbed social and emotional function, effecting the growth and survival of dendrites, axons, synapses, interneurons, neurons, and glia. Neurochemical 'affective' systems regulate seeking behaviour, attachment and learning (Panksepp 1998). The amygdala, cingulate, and septal nuclei develop at different rates, which correlate with the emergence of wariness, fear, selective attachments, play behavior, and the 'oral' and 'phallic' stages of development. These immature limbic nuclei are 'experience-expectant,' and may be differentially injured depending at what stage they suffer deprivation. The medial amygdala and later the cingulate and septal nuclei are the most vulnerable in the first 3 years of life, along with the orbitofrontal and temporal cortex (Schore 1994). Deprived of stimulation the sub-cortical nuclei may atrophy, develop seizure-like activity or form abnormal synaptic interconnections, resulting in social withdrawal, pathological shyness, explosive and inappropriate emotionality, and an inability to form normal emotional attachments (Joseph 1999). Since long term synaptic learning must involve changes in gene expression, the environment exercises its effects on the brain through the modulation of gene activity. Evolution has created a mechanism for capturing environmental influences.

In a more specific sense, in the spirit of the 'Swiss Army knife' model of a brain evolved efficiently to learn from its likely environment (Barkow, Cosmides et al. 1996), specialised cognitive domains or faculties of mind have been postulated. Clearly there are motive systems that favour certain forms of cognition. Besides the individual's intelligence for transactions with the physical world was, it is supposed, a domain of social intelligence tailored to interactions within the species. The evidence from comparative brain anatomy is clear. Mechanisms of bodily self-regulation evolved into motor systems for communicative self-expression and social engagement (Porges 1997). Primates possess a degree of it and humans are said to have more (Byrne and Whiten 1988, 1997; Mithen 1996). Of greatest interest to us here is the proposed domain of 'natural history intelligence.'

The evidence for a specialised intelligence that enables chimpanzees to forage efficiently, remember the locations of hidden objects, and navigate to tool-using sites like anvil stones is mounting. Some birds can recall the locations of thousands of hidden seeds. Rats develop cognitive maps of their home range. Primates clearly have added abilities to form complex hypotheses about the *likely* location of food. Chimpanzees may have a micro-domain for establishing mental maps, but not as far as we know a fully-fledged natural history

intelligence. By contrast, humans may have a natural history intelligence consisting of at least three sub-domains: one for thinking about animals, one for plants, and one for geography of the landscape. Some authors identify natural history intelligence as a characteristic of Homo habilis' colonisation of landscapes outside Africa well over one million years ago (Mithen 1996, 78 & 123).

Through magnetic resonance imaging, positron emission tomography and other techniques it is possible for cognitive neuroscientists to monitor the brain in vivo, but little has been revealed that confirms or denies these speculations about the 'cognitive' nature of natural 'modules of intelligence'. There is still no clear link between the speculations about kinds of 'cleverness' and the needs for social support of motives and emotions. There appears to have been no quantitative work on the potentially permanent but perhaps subcritical effects of differentiated (natural) environmental experience. For instance, there may be subtle but lasting effects of the loss of freedom and narrowing of sensual experience inherent in living in cities, or of the loss of contact with other species. On this brain science appears to be silent.

It is difficult to conceive of a complex animal which retains complete experiential plasticity throughout life, since this would also effectively be to lack memory, assuming the storehouse of experience lodged in memory serves as a permanent or 'implastic' buffer against erroneous moment-to-moment experience. Nevertheless, who we become is neither totally inbuilt nor totally experiential. It necessarily depends on what we actively experience in the company of others with like minds. Darwin (1877) postulated that we might have an evolved basis for our fearful reactions to some natural stimuli. It has more recently been suggested that this should take the form of biologically prepared learning, which supposes that humans and many other species are predisposed to quickly learn and retain responses or associations that enhance the probability of survival (Seligman 1971).

2.3.2 Mammalian consciousness

What distinguishes learning in mammals from other animals? Principally, the differentiation of mammalian consciousness which occurred with increasing complexity of bodily movement, the evolution of elaborate locomotive skills, the ability to 'work on' or transform food resources and the enhancement of the capacity for nurturance, sharing, social grouping and communication. Building upon this complexity of activity and awareness, primates possess varying degrees of self-reflexivity, the planned display of behaviour that may be deceptive to others (Byrne and Whiten 1988, 1997) or co-operative with them (de Waal 1996, 2001) . Coupled with the dexterity inherent in the possession of an opposable

thumb, and omnivorousness with ‘intrusive foraging’, this constellation of aptitudes allows primates to range opportunistically across the widest range of habitats and microclimates, constantly exploring for new food sources and safety. However it is in the social adaptations of the brain and use of the body for communication of consciousness that mammals seem to have excelled.

2.3.2.1 Attachment needs I: Food and protection

Early speculations on mother-infant relations in both humans and other animals supposed, consistent with Freud’s notion of basic drives, that infants – incapable of gathering their own food supplies - pay special attention to their mother and return to her regularly so that they have the highest chance of being fed. Undoubtedly this is a need, but even independently capable adults in the primate ‘band’ need constantly to be aware of their whereabouts in relation to the others, for fear of predators and for efficient collective exploitation of environmental resources. Youngsters in particular, more vulnerable than and dependent on adults, must know their mother and be constantly vigilant about their distance from her, ever ready to return swiftly to the protection she offers.

Harlow demonstrated a differentiation between the need to return for food and for other reasons: Rhesus monkeys seek proximity to inanimate surrogate mothers that offer physical comfort, not food (Harlow and Suomi 1970; Harlow and Zimmermann 1996). However monkeys form stronger ‘attachments’ to real mothers, and react more strongly when separated from a mother (Meyer, Novak et al. 1975). Certainly mammals seem to have a predisposition to forming close bonds with proximate others who share mammalian characteristics, irrespective of normal adult-to-adult relationships. For example, strong cross-species social ‘attachments’ have been produced by confining together lambs and dogs (Cairns and Johnson 1965). Whatever their early infant experience, as they mature, preferences seem to emerge: individuals brought up among mixed groups of three macaque species show a predilection for members of the familiar species from 3 to 9 months, which is superceded by own-species preference after 9 months (Chamove and Harlow 1975). It is clear that these safety- and comfort-seeking behaviours are evolved for the purposes of survival and the promotion of teaching-learning relationships, and that they are mediated by emotional self-other-regulation (Trevarthen and Aitken 1994). The long early attachment experience of the primate collective effectively extends the already lengthy period of maturation in the protection and security of parents, characteristic of higher mammals.

2.3.2.2 Attachment needs II: Knowledge of a home environment and the beginnings of culture

The inquisitive and exploratory behaviour of mammals which is especially evident in primates is accompanied by a well-developed capacity for remembering multiple salient features of environments including the location of food-producing plant and self-made food stores, water sources, convenient pathways through landscapes. As noted above, this mental mapping is not unique to mammals, but their all-round capacity across these categories is of a different order. Especially notable in the present context, and in the light of the suggestion that humans in particular are equipped with a 'natural history module' of the brain, are studies showing that young children may have a particular ability to distinguish natural from man-made stimuli. They seem equipped to make the animate-inanimate distinction (Gelman 1990; Gelman and Markman 1987). At age six, children can spontaneously sort the natural from the man made (Wohlwill 1983), but even in newborns there is evident sensitivity to signs of human presence and animate movement.

Analogous to findings about the universality of colour perception, it has been demonstrated that there is cross-cultural similarity in the categories that adults use to identify animals and plants, implying the possibility that such categories are not learned, but innate. It may be that we classify things in the way we do because it has been an evolutionary advantage to have been able to do so (Atran 1990).

Even if that possibility is discounted, it is evident that humans excel in cultural learning (Donald 2001). Other social animals may exhibit transmissible behaviours that have been termed 'culture', such as 'tool' use in primates to assist extractive foraging and memory for sources of vital salt nutrients in elephants (BBC 2002), social hierarchies and the practice and teaching of collective gathering and hunting, but human culture is by far the most complex and 'open-ended'. Whether humans are 'a race apart' rather than a particularly fine specimen of the mammal fraternity is a debate that will not be conducted here!

2.3.3 Humans and knowing about a place to live

Humans are different not because we are conscious of ourselves - a trait possibly shared with many animals – but because we are aware of that consciousness in ourselves and in others, and of how this mutual awareness may be regulated by cultural rules. Human intersubjectivity (an awareness of others' subjective states) and moral sympathy may have arisen as an advantage in hunting, in which the ability to learn the habits and thus – by

imagining our way into the mind of another species - predict the movements of prey would have paid off. But collaborative awareness has benefits in gathering plant material too.

Humans have an exceptionally long period of parental dependence, which counts for around a quarter of the lifespan, affording the opportunity for transmission of an exceptionally rich and deep cultural heritage. Nor does learning cease at this point of theoretical independence – it continues not only formally in the sense of higher education but also informally in often-lifelong attempts to gain expertise in a huge variety of skills and cultural rituals. This enduring hunger for learning may have been evolved in support of what is supposed as the prehistoric lifestyle that fostered our long-term migration to and colonisation of less immediately welcoming environments. Wandering bands and larger tribal groups practiced seasonal migrations (transhumance) in pursuit of resources and prey (Campbell 1985; Lovejoy 1981) – and would therefore need not only to remember where they should be at what time of year, but also be sufficiently flexible to take note of changes in circumstances, like early rains, which would have heralded perhaps accelerated maturation of fruit and other food sources. It comes as no surprise then to find that we still appear to be strongly attuned to cues about the landscape.

2.3.3.1 We like natural landscapes: Why?

From over three decades of extensive research, it is clear that a preference for natural over human-created environments is essentially universal (Kaplan, Kaplan et al. 1998). It develops among children as young as 8 (Balling and Falk 1982) and continues into maturity, although adolescents seem to show a less marked preference than other age groups and more interest in situations which afford opportunities to socialise (Kaplan and Kaplan 2002).

For example, numerous studies have asked people to rank photographs of landscapes in order of preference. Man-made features like power lines generally detract from the attractiveness of a scene; natural features enhance it. Natural landscapes are said to have stress-reducing properties, as has recreation in wild areas. Even slides of such scenes lower heart rate. Prisoners who can see woods or farms are less often sick than those who view the inside of the prison, and psychiatric, surgical and dental patients are all helped by scenic pictures (Heerwagen and Orians 1993; Orians and Heerwagen 1992; Ulrich, R. 1993)

People voluntarily choose natural scenes for decoration. In a survey of pictures (including family photographs) in houses around New York, one third were landscapes. They were the most or second most common pictorial subject in 3 of 4 houses, except those in an area of particular natural beauty. Peaceful scenes counted for 347 of 349 landscapes, and over half

those who liked abstract art confessed that it reminded them of natural scenes (Halle 1993). Interestingly, human figures were present in only 11% of contemporary landscapes, but in 71% of scenes of non-industrial countries or the past. It has been suggested that the paintings' owners may have been expressing a belief that modern humans represent damage to the natural world (Hinde 1998). Several not necessarily mutually exclusive proposals have been made as to why natural landscapes are so appealing to us.

2.3.3.1.1 Complexity and interest

It may be that our preferences for natural landscapes are mediated simply by the degree to which they provide a cognitive challenge. Environments offering greater two- and three-dimensional visual complexity, including irregularities and the promise of more information if one could enter or alter one's position in relation to the scene, are preferred. Plain, regular scenes offering few inferences of 'mystery' are associated with low preference. The suggestion has been made that complex yet coherent scenes demand more attention and cognitive processing and play on our desires to explore and understand (Kaplan and Kaplan 1989). These suggestions may be correct, but the theory provides no underlying reasons as to why the phenomenon would occur.

2.3.3.1.2 Savannah hypothesis

Savannah environments are said to have been the environment of early humans and the site of our early evolution in which we developed some of our critical characteristics, for instance an upright posture. Food sources were probably abundant, opportunities for watching out for danger many, and possibilities of escape from predation great. The preference might therefore constitute some kind of evolutionary 'imprint' on our psyche.

There is widespread cross-cultural evidence to support this (Ribe 1989; Ruiz and Bernaldez 1982; Ulrich 1977). However, there remains a requirement for a motivational as well as an evolutionary genetic explanation.

2.3.3.1.3 Prospect and refuge

If people prefer savannah-type environments, what is it about these surroundings that are of particular interest? The characteristics of savannah include open swathes of grass with occasional protective cover like trees and rocky outcrops, which offer escape routes and

places from which one can see but not be seen. Indeed, it appears that trees with intermediate canopy density and those whose trunks bifurcate low down – common in fertile savannah locations - seem especially attractive (Orians and Heerwagen 1992).

Appleton, surveying English landscape painting, suggested the formulation that having a panoramic view of the surroundings (prospect) and a good place for concealment (refuge) were the critical human preferences (Appleton 1975). Orians and Heerwagen point out that the decision about which place to inhabit is probably multi-staged, taking note of current usefulness and future prospects. For example, a liking for flowers could be linked to the fact that flowers presage the production of fruit. Variations in this attractedness may also be related to geographical differences: seasonality being less marked in the tropics, where perhaps not coincidentally flowers are considered less important (Goody 1993).

It has therefore been hypothesized that humans have an innate preference for semi-open savannah- or parkland-type habitats which offer a good view of potential predators but also the possibility of hiding, and where there are signs of likely food sources, such as water and green vegetation.

2.3.3.2 Historical trends modify the sense of place

There is however a possible confounding factor: landscape preferences change over time. At the Renaissance, large settlements were synonymous with courtesy and the country with crudeness. The opposite had become the case by the late eighteenth century, the countryside now seen as more attractive, a view that was reinforced as the Industrial Revolution brought teeming, rank cities. Partiality to particular kinds of landscapes may also be influenced by personality: harsh scenes may be particularly attractive to risk-taking young men, or perhaps those who would like to imagine themselves being adventurous (Thomas 1984).

The immediate answer may be that our innate predispositions are overtaken by cultural influences. Indeed, in a study of people from European, American and Asian cultures of different ages who, crucially, had never visited tropical savannah, children as young as 8 showed a clear preference for savannah, but from the age of 15 coniferous and deciduous forests were preferred equally to savannah (Balling and Falk 1982).

It is also worth noting the argument that over the course of recent history with ongoing urbanisation and ‘sedentarisation’, or more facetiously sedimentation, we have effectively domesticated our own species, regimenting our lifestyles (Wilson 1988) to the extent that fewer and fewer humans live lives which necessitate intimate three-dimensional awareness of landscape, instead perceiving them increasingly as aesthetically pleasing two-dimensional

backdrops from our immobile buildings and streaming prospects for movement forward from climate-maintained, motorway-bound vehicles.

2.3.3.3 Iconic symbolism: Shared places

Particular landscape features can also become iconic for particular cultures. Recall the symbolism of Mount Fuji for the Japanese, Niagara Falls for Americans, or the White Cliffs of Dover during the Second World War.

Might it be that, as cultures value such national symbols, sub-cultures (geographic or otherwise) come to value most highly more specific, localized landscape features? It may be that the features become symbolic due to their strong archetypal appeal to our evolutionary predispositions, a proposition which has been taken a step further with the successfully applied notion that prehistoric archaeology might stand to 'unearth' hitherto unknown monuments and their meanings by spending a great deal of time near them in a meditative frame of mind (Devereux 1996). Conversely, the same sign can carry vastly differing connotations in different cultures. Woodland and forest have variously stood for liberty in England, religious transcendence in the Unites States, national independence in Poland (Schama 1996) and, in many cultures, the home of good and bad mythological creatures.

In both cases, however, the influence of spoken and written culture is highly unlikely to have an influence on pre-verbal children. Probably far more important developmentally than specific local or national monuments is the universe of more abstract mythological forms, popular among children from perhaps the middle of their first decade.

2.3.3.4 Gender differences in sense of place

There are measurable gender differences in brain function and behaviour in relation to place. For example, whilst women tend to use contextual information and landmarks to aid in navigation, men are better able to find their way in the absence of such information, having a stronger 'internal compass' (Collaer and Nelson 2002). Under stress, men tend to heighten confrontation or seek physical escape, whilst women tend to seek to reduce distress and build bonds of friendship that enhance social networks. This difference may be built on the 'attachment-caregiving' system with differential neuroendocrine function at its core, for the protection of self and offspring (Taylor, Klein et al. 2000). Women show a greater affinity for enclosure and protected places than men, and explanations have included the requirements for protection during pregnancy and of infants (Hawkes 1987), defence against

male sexual aggressors, and the sexual division of labour (Heerwagen and Orians 1993). All of these suggestions may fit under the umbrella of a theory of evolved sex role differences, but the important point here is that if this is so, one would expect universal or near universal differences in men's and women's patterns of relating to the natural world.

2.3.4 The Biophilia Hypothesis and an 'environment recognition device' in animal minds

Some in the social sciences remain advocates of the empiricist notion that the human being enters the world possessing a 'blank slate' of a mind: the analogy of a powerful but unprogrammed general purpose computer has been drawn. The individual learns everything from his or her culture, and has completely free will to do as he or she chooses. The opposite, nativist or biological determinist view holds that we possess profound innate directedness and that free choice is illusory. The consensus among students of human nature is increasingly that these views are unsophisticated extremes. The constructivist position admits both a degree of heritability of cognitive and personality traits *and* an effect of nurture, or upbringing, and the dialectical constructivist (Geertz 1973) position takes this further: it is human nature to create culture. Together, in the interaction of lived experience, they shape our minds and behaviours (this is incidentally akin to the Buddhist formulation of 'dependent co-arising' (Macy 1991a)).

The debate has largely moved on to where the balance in each case is, and why. For example, there is probably some genetic influence in certain critical domains of development like attachment, empathy, and social competence whilst other behaviours, like violent crime, may be attributable largely to social circumstances (Plomin 1994). Where a characteristic or behaviour is universal or near universal across cultures, the suspicion that it is based on evolved predispositions is raised (for example male violence is always greater); where good counter-cases can be cited, it is unlikely.

Combining notions from archaeology, genetics and psychology, evolutionary psychologists postulate an 'environment of evolutionary adaptation' (EEA), which over hundreds of thousands of years has profoundly shaped our psyche (Barkow, Cosmides et al. 1996). The resulting 'mental landscape' equips us with a variety of highly attuned specialist cognitive modules that allow us to do some things extraordinarily well 'out of the box' (for example detecting cheating when resources are involved), whilst other tasks prove much more difficult: the common analogy in this case has been the Swiss army knife, a device offering a variety of prescribed uses. This notion is in a sense a refinement of the early ethological concept of instinct with superior justification and, although erudite critics like

Stephen J. Gould and Stephen Rose insist it is a collection of 'just so stories', it does according to adherents possess a degree of falsifiability. If correct, the EEA model could help explain inherently survival-orientated but subconscious behaviours like the avoidance of potential poisons during pregnancy (Barkow, Cosmides et al. 1996) and why certain 'cave-man' like behaviours remain indelibly part of our psyche (van Tine 1999). However much work in this area focuses on adaptations to immediate social interactions.

As early as 1973 it was proposed that since organisms are selected by environments, physical and social health depends on the continuing availability of that optimum evolutionary and ecological environment (Iltis 1973). Later, naturalist E.O. Wilson proposed what might be seen as a natural environment version of evolutionary psychology, the Biophilia Hypothesis (Wilson 1984). Biophilia suggests that we have an inbred 'love of nature' (or more strictly love of the living) which, whilst being evident in our aesthetic senses and emotional well-being (Flanagan and Flanagan 1998), exists since it is a useful aid to survival. For instance green, which lowers heart rates and is the most common favourite colour, may be so because recognising the survival value of healthy vegetation on the primaeval savannah (signifying water and water sources, which attract game) helped early humans survive. It can be argued that Wilson merely aggregated pre-existing notions and conjoured up a memorable name (Hill 1994). For instance, it had previously been proposed that humans and plants are co-evolved in such a way that humans 'need' them mentally (Conklin 1972a, b), and that we must interact with animals to be 'fully human' – a state itself considered a product of human-animal mental coevolution (Shepard 1978).

Later expositions extended the range of claims for evolutionary influences on the psyche and in particular began to muster quantitative evidence. Whilst we are highly reactive to certain phenomena in nature, not all reactions are positive: the best evidence to date for Biophilia is said to be the evidence for the implied complementary biophobia, one demonstration of which is the subconscious skin resistance reactions to naturally dangerous stimuli (spiders and snakes but not guns & knives) (Kellert and Wilson 1993). However this may be a simplification. Wild-reared Rhesus monkeys are afraid of snakes, but laboratory-reared ones show little fear. After watching a video of a wild monkey showing a fear response, captive ones themselves start to be afraid. But if the video shows the wild monkey fearing a flower, laboratory monkeys do not learn that (Mineka 1987). Hence the fear response is an innate predisposition that requires confirmatory experience to activate. In humans, snakes have long symbolized evil, which might be thought to demonstrate an innate fear. However, in eastern cultures, snakes also signify power, health or royalty. Analogously to rhesus monkeys, the human response to snakes appears to depend upon an initial predisposition and on learning (Hinde 1998). It may be that the use of snakes as symbolic of

power and protection does have its basis in fear (Mundkur 1983), but the meanings of other culturally significant natural symbols – for instance the British bulldog and lion – may be primarily culturally mediated.

Fears are said to develop in a known order. After an early attachment period there may be a rise and fall of certain fears that occur in a predictable, ontogenetic sequence. Experiential, maturational, and genetic factors interact in fears of heights, novelty, strangers, and separation. Control of these fears is established by a continuum between genes and the environment, unlearned prepotent fears, emergence of fear after initial indiscriminate approaches, modifiers of fear, effects of early experience on later emotionality, class and ethnic factors, and fearfulness as a trait (Marks 1987). It may be that all true human phobias - falling, darkness, open spaces, being shut in – are of situations that would have been dangerous to human ancestors (Marks 1987).

Another example concerns the significance of colours. All known cultures first name the 'colours' black and white, followed by red – which is as far as one third of them go. The remaining two thirds go on to define at least green and yellow. Finer distinctions such as blue, brown, purple, pink, orange and grey are used in successively fewer languages. The remarkable thing is, however, that this is a one-way street. No culture that names green, for example, fails also to name red (Berlin and Kay 1969). Why should red be universally recognized? Red is aversive to rhesus monkeys, and particularly salient to humans. Pervasive red light induces arousal, and red vision is least easily impaired by brain lesions. Though it carries a variety of specific meanings in differing cultures, it is everywhere seen as a powerful, active colour (Humphrey 1983). Is it because red is the colour of blood, signifier of life and death? (Shepard 1992) A reliable sign of ripeness in fruit? Also of note is that scientific classifications of the world are not arbitrary, but are rooted in evolutionarily useful discriminations (Atran 1990).

Nevertheless, the phenomenal worlds of other species are unique to them, dictated by their sense organs, behavioural repertoire and phylogeny (Von Uexkull 1957). Despite the environment's being, in objective terms, the same we experience our home differently from a cat. We are relatively insensitive to smell, yet see a richer world of colour. The same garden flowers are experienced profoundly differently by the bee and ourselves: we cannot see ultraviolet. We hear different frequencies than the bat. Given that 'what we cannot experience is not properly considered part of our environment', strictly speaking we, the cat, bee and bat all live in mutually overlapping but different environments (Hinde 1998, 6-7). To inhabit and experience the subjective qualia of another species' is something we can only ever approach, never emulate. We do not even have the mental tools to imagine what it is

like for another species to be itself, rather than what it would be like for a human to inhabit another species' skin (Nagel 1974).

Excluded from their private inner worlds, we lack a means to corroborate outward behaviour with subjective experience, and are reduced to describing it as 'instinctive'. Innovation in this area may be possible if novel methodologies which claim at least to be able to make reliable judgments about animals' emotional states are employed (Wemelsfelder 2001; Wemelsfelder, Hunter et al. 2001).

However questions remain: apparently biophilic behaviour may be demonstrated, but is it universal? Could it be not so much a 'love of nature' as a love of what we grow up to be familiar with? To what extent is it 'normative' – if we are brought up in significantly 'non-natural' surroundings, are we not comfortable with them? How could genes determine such a complex level of preferences, and what would be the detriment (i.e. how great are tolerances, what happens if they are not met) if unsatisfied? Later discussion will touch on these points.

2.4 Ideas of the self

2.4.1 Self consciousness: Knowing action

Is the 'self' a 'real' thing? The modern western notion of 'self' as a self-aware, individualistic entity may well be a product of modernity, having arisen within historical time and still not being the dominant state of mind of some humans (Jaynes 1993). Even assuming that most modern humans would accept their 'selfhood', ideas of what the 'self' is supposed to constitute – for instance in terms of the balance between obligations to society and obeisance to the individual's desires – are contingent between cultures, the classic example being the collectivism that westerners often negatively identify in eastern societies.

Assuming a conception of modern selfhood to mean the possession of self-awareness and a will more or less under voluntary control, the crux of the debate shifts to how such a phenomenon can arise from mere flesh and blood and in the central nervous system. The recent growth in consciousness studies has produced a range of hypotheses about this so-called 'hard problem': how the organisationally complex but not necessarily biochemically incomprehensible functioning of brain tissue generates the 'qualia', or subjective feeling, of self consciousness. The debate rumbles between those who are said to postulate a 'Cartesian Theatre' (a location in the brain where the many facets of awareness converge and are 'perceived') and those who believe the feeling is more diffuse: shifting, flowing waves of awareness which are not necessarily continuous and occur mainly after the sub-conscious

body and lower brain sense and make decisions, producing what may largely be an illusion of conscious control (Damasio 1995; Dennett 1991).

Consciousness is probably an emergent property of brains, not utilising in primates any mechanisms different from lower mammals (Baars 2001). Many animals are said to have socially relevant 'personalities' (Gosling, Undated; Gosling and John 1999), and recent claims have been made that even that animal of particular dumb repute, the sheep, may experience a degree of self-consciousness (Briggs 2001; Kendrick, da Costa et al. 2001). Some insist that there *are* qualitative differences between humans and other animals, for instance in the way that individual human consciousness is intimately woven into the collective culture to form a 'distributed cognitive network' that exists partly outside our brains in the form of material culture (Donald 2001).

Recently it has been claimed – at least partly on the basis of reputable pharmacological evidence - that not only are the mind and body intimately connected, but that the subconscious mind actually inhabits the body and not exclusively the brain (Pert 1999, 2000), a notion which poses significant challenges to certain ideas of western philosophy (Lakoff and Johnson 1999). Clearly, cultures that have traditionally attributed self-awareness not to the head but the heart were not barking up a completely wrong tree.

The position that consciousness in humans or animals was irrelevant to explaining an animal's actions, which was foundational to behaviourism, now seems wholly abandoned. Evidence from observational studies of various animals (Amarelo 2002; Byrne and Whiten 1988, 1997); from clinical reconstruction of the subjective experience of self in psychoanalysis (Stern 2000, 13-18); from PET scanning of the functioning of the brain during different cognitive tasks; and, arguably, from common sense appears to have amply underpinned the case both for the existence and the significance of consciousness.

A more esoteric conception, often associated with eastern spirituality but sometimes now with the 'new physics' is that the self is merely a 'knot' of awareness in an invisible 'sea' of consciousness (Capra 1975). This 'unseen cause' style of explanation, though not necessarily invalid at its own level, does not lend itself to procedures of shared and rigorous falsification and it therefore not pursued herein.

On a practical basis, however, it is clear that the possession of selfhood gives us:

- A dynamic image of the self as a moving body, and its intentional, perceptual and emotional capacities;
- Guiding 'future sense' principles for self-orientation, protection, avoidance and decision making;

- A basis from which to interact (as will become clear shortly, it may be that this can usefully be characterised as an internal 'secure base');
- A working model of self-interest, bringing into actuality (from abstraction) a moral framework.

2.4.2 How does the human self arise?

A person who grows up entirely isolated from other people, if this were possible, would receive no cues about human culture from which to learn. Real life versions of this experiment have been claimed for feral children (Candland 1993; Newton 2001). When brought into human society children kept from human contact but alive with animals have various age-related social (particularly linguistic) impairments, but they retain self-interest and a secure sense of who they are. These children have generally lived in a natural environment in close relationship with animals such as wolves, with whom they appear to have been able to establish certain facets of normal relational bonds. Deprivation of these last props of connection with the 'real' world (for instance in cases where the child has been brought up locked in a darkened room) leads to different, more profound pathologies. The reverse experiment where nothing living is encountered that is not human may be more difficult to conceive of, but the lives of poor, inner city tower-block children may come close. Circumstances like these yield their own particular set of problems (e.g. poor self control) and undoubtedly reduce life chances, but there appears to be little direct evidence about effects on the sense of self beyond an anecdotal consensus that it is damaged, and virtually no empirical evidence of the effects of lack of contact with non-human nature.

It seems possible to conclude that the development of a fully human sense of self probably rests not only on an interaction of innate motivations with a world that is social and human, but is also *more than human*. Humans do not now and never have lived in a wholly human world: it may therefore be that our place in it cannot properly be appreciated nor acted out from exclusively human encounters. In this context it is interesting to note that almost all developmental theories have failed to mention the non-human or, at best, relegated it to two-dimensional (i.e. immobile, non-responsive) scenery.

2.4.3 The instinctual 'need' for others in social species

Lorenz observed that there is a distinct sensitive period just hours long in lower vertebrate neonates such as birds during which time they 'imprint on' or 'become attached' to moving

objects in close proximity. Whilst a degree of this imprinting occurs to inanimate perceptual features of the object (Eiserer 1980) betraying its origins in innate perceptual patterns, the goal is that the chick locks on at an early and vulnerable stage to its mother as a source of security. So strong is the instinct that Rhesus monkey can form attachments to dogs or inanimate objects (Mason and Capitanio 1988). As we rise up the phylogenetic tree the principle applies in a progressively less binary way. In a mammalian model, the guinea pig, the birth-attachment-detachment cycle is more drawn out (Pettijohn 1979a), declining to zero after 12 weeks (Pettijohn 1979b). Early ideas that there was a clean-cut sensitive period in humans were questioned long ago (Rutter 1981) but evidence remains for a more diffuse, longer lasting sensitivity plus greater elasticity in the longer term. The process of parent-offspring attachment is two-way: Lorenz believed that babyish features elicit parenting behaviour and in 1950 even suggested that Disney animals are aberrant anthropomorphs designed to elicit parenting behaviour in human adults, which was later confirmed experimentally (Fullard and Reiling 1976).

There is now empirical support for the hypothesis that the desire for proximity is driven in mammals at least by 'social motivation circuitry' that predisposes the seeking out of like others. Oxytocin, vasopressin, endogenous opioids and catecholamines appear to be the psychobiological substrates of social bonding and other affiliative behaviors including maternal behavior, sexual behavior and social memory in rats (Nelson and Panksepp 1998), other mammals including prairie voles (Young, Lim et al. 2001) and therefore quite probably in human infants too. The separation-distress dimension of this system has been demonstrated. Clearly there are substantial implications for understanding human bonding, friendships and more complex social motivations as well as the origins of many psychiatric disorders (Panksepp, Nelson et al. 1997; Schore 1994). This need for contact and sympathetic response from others at the most basic levels is also one of the richest fields for psychotherapeutic investigation and understanding (Klein 1997).

Attachment, as this process is termed in higher mammals, is therefore a necessary but not sufficient condition for the prospering of early relationships and for their benefits in development. As we will shortly see, it does not explain so much as frame interpersonal behaviour, and motivation for attachment has lifelong manifestations.

2.4.4 Self in relation, or intersubjectivity

Though the primary goal of proximity-seeking behaviour has been identified as survival, this is of course not its only outcome. In an ethological view, motivated behavioural interactions allow 'testing' of the self, helping establish boundaries of behaviour with other

individuals and social hierarchies. More complexly, spending time in close proximity to others is an interactive experience that is itself critical to the shaping of both the sense of self and personality more broadly. It is the crucible of an *intersubjective* communicative dance not only within which selfhood arises, but without which it *could not* fully arise.

A more comprehensive model (Figure 2.1) depicts three domains of infant engagement (Trevarthen and Aitken 1994, 2001) and the model also seems appropriate to adulthood. The foundation of practical care and nurturance rests on attachment-driven interaction with others, these relations are asymmetrical and dependent and the infant's self-interest prevails: nevertheless trust must be established at this level for the ministrations of others to be successful.

Secondly, the infant encounters and is curious about objects and their properties, seeking interactions that help develop vital perceptual and cognitive skills but which do not alone govern the course of social learning. Finally, a more equal domain of relating exists through which cultural learning takes place, where the emphasis is on sharing knowledge and skills by acknowledging the selfhood (and conscious agency) of the other, especially in relation to objects and their uses where both parties endeavour to compare their perceptions with those of their companion. It is in experiencing and re-imagining the approval of the other to interests and achievements that a child begins to experience emotions of pride and shame.

In terms of relations to the non-human and also the varieties of relationship quality shown within human relationships, this model requires some extension. Nature is neither entirely subject nor object: clearly (in the rational scientific tradition) a stone is an unresponsive object, and a dog (however degraded by selective breeding) a subject with its own desires often evident to humans. But a pet bird? The problem is that there is a continuum between the two. Objects do not bear labels identifying them as partially suitable for treatment as subjects; the infant may be pre-equipped to assume that things with big eyes that move are subjects, but best learns where to place on the continuum each thing encountered through praxis.

Even in interhuman relationships, behaviour and attitudes can temporally and intrapersonally range from an ideal of complete mutual respect and care (Macmurray 1991) to the soldier's brutal objectification of his opponent. Trevarthen and Aitken's model is best approached as a map of possible relations. Whilst all develop simultaneously, being adequately taken care of (and the feelings of safety that that engenders) are necessary underpinnings for exploration and successful companionship.

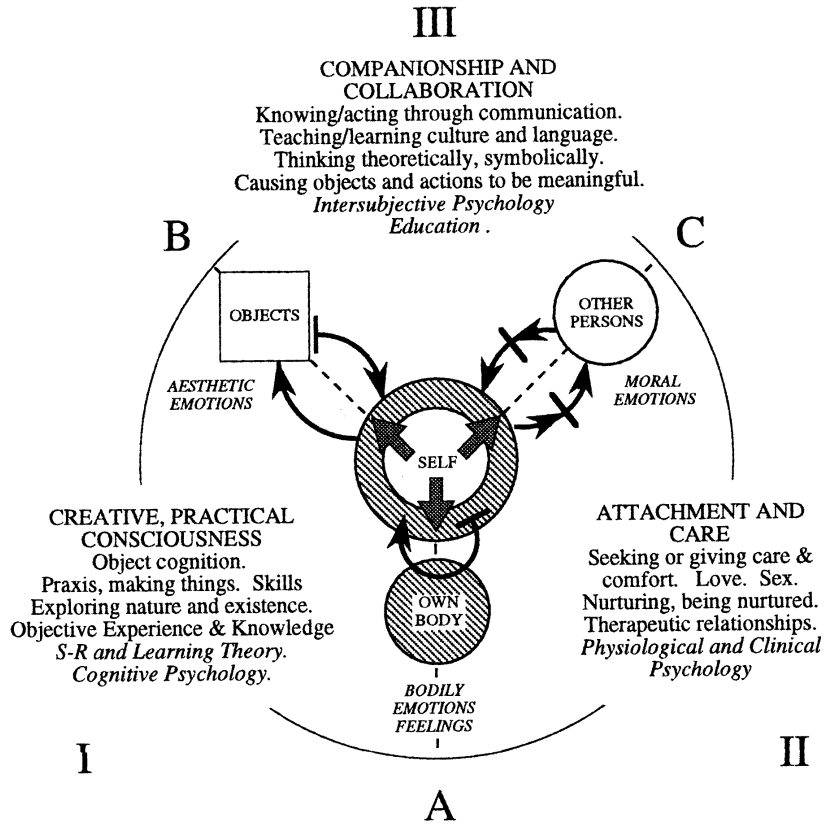


Figure 2. Intrinsic motives coordinate three types of engagement of a human subject with the body and the outside world: A—Processes that regulate the physiological functions of the body maintain the subject's organismic integrity and sustain vital functions; B—Engagements with physical objects and situations assume anticipatory control over the effects of actions, aided by perception of the properties of the objects and surroundings and what they afford for different purposes; C—Communication with other subjects, and any adjustment to their behaviour, must take account of their purposes and awareness. This communication and anticipation of other subjects' behaviour is aided by perception of their motives and emotions, which are detected by perception of movements and autonomic adjustments that prepare for critical intentions to be carried out. Combinations of these three kinds of motive generate three domains of subjective and intersubjective life: I—Individual subjects can act on the physical world to benefit their existence as organisms, evaluating objects and situations in terms of their usefulness for nutrition, self-protection, comfort, etc.; II—Aid from other subjects may be enlisted to benefit individual's state of wellbeing or comfort. The kind of relationship described as "Attachment" between a child and caregiver is of this kind; III—When subjects act collaboratively with joint and mutually aware interest in their common world of objects and places where they may act and plan actions together, they gain intersubjective understanding of common meanings. This is the "companionship" that leads to cultural learning of all kinds.

Source: Trevarthen & Aitken (2001), p15.

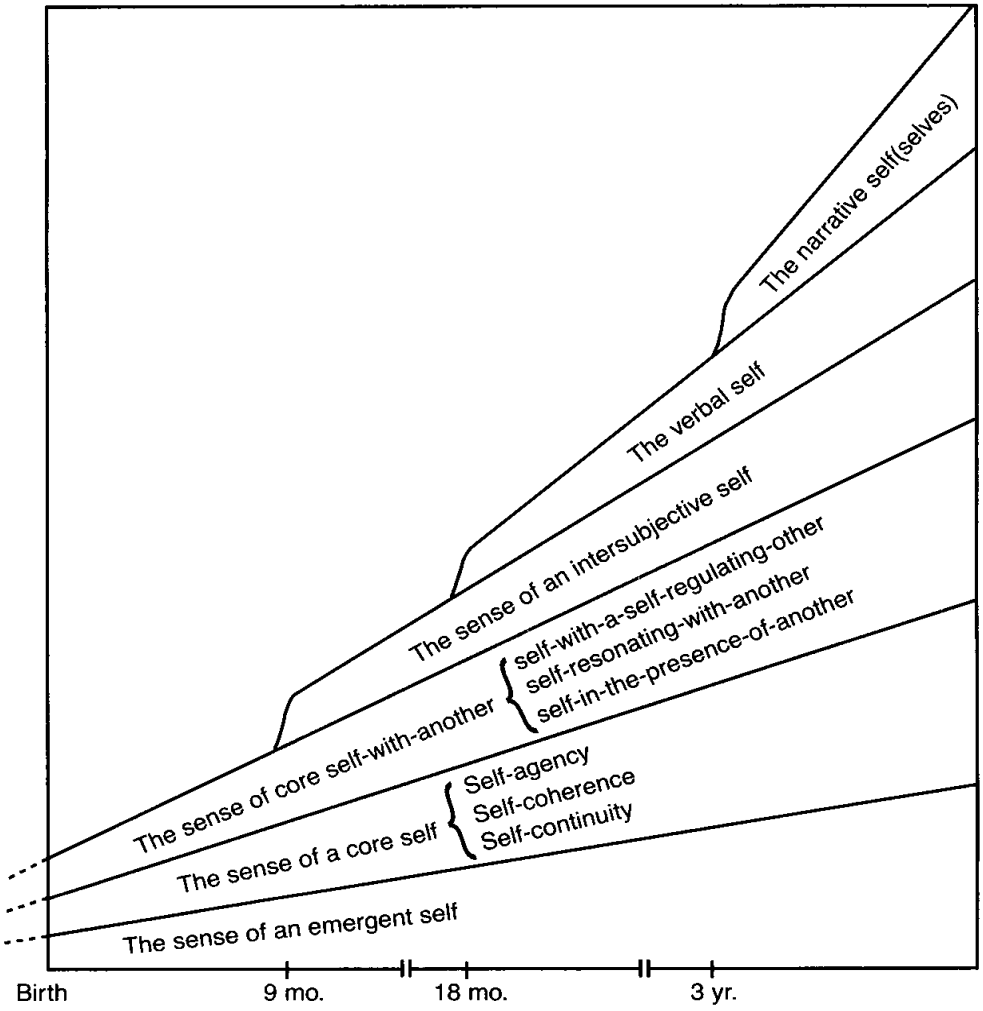
Figure 2.1: Trevarthen's three relational domains

2.4.5 *Staged transformations*

Piaget supposed that childhood mental development proceeds in a predetermined sequence of age-specific stages each of which is contingent on the previous stage. At each the infant's worldview is dramatically altered, subsuming or reframing the previous stage. Earlier phases can be revisited but only under conditions like stress, fatigue or psychopathology. Without having wholly overturned the basic notion, later authors have considerably modified this conception showing, for instance, that neonates have far greater coherence of innate motivation and awareness of objects than previously thought, and that

their capacity for relating to other persons as well as their intellectual assets have seriously been underestimated (Lacerda, von Hofsten et al. 2001; Trevarthen 1998).

Stern challenged a central tenet of the Piagetian view, suggesting that each stage supplements but leaves intact the previous one: no special conditions are needed to move between these 'senses of self' or 'domains of relatedness' as they are all present and experienced simultaneously (Stern 2000).



Source: Stern (2000)

Figure 2.2: Stern's conception of the emergence of self

In Stern's formulation (Figure 2.2), early experiences remain pertinent to the growing child and later adult not just because of their transmuted effects but because they remain directly meaningful to an aspect of self. Senses of 'emergent', 'core' and '-with-another'

selves are present from birth. Concentric or 'nested' selves are present throughout life, and the psychotherapeutic language of needing to 'take care of one's inner child' begins to make sense. Though a lengthy psychotherapeutic excursion would probably be out of place here, it may at least be worth mentioning how this view appears to lend support to Carl Rogers' understanding of the fully integrated self being a personality that neither denies nor seeks to privilege any aspect of self over any other, and is therefore at ease with itself (Rogers 1961).

2.5 Attachment theory

2.5.1 Origins in ethology and psychoanalysis

John Bowlby was a psychoanalytically-trained British psychiatrist, attracted by its explanatory and therapeutic power but uneasy with its poor empirical base. Observing in the 1940s that deprived upbringings could have deleterious effects on later behaviour (Bowlby 1944), he made his name with a bestselling post-war report for the World Health Organisation on the mental health of homeless children (Bowlby 1951, 1953). Seeking to provide scientific underpinnings to Object Relations theory, in 1952 he encountered the then new branch of applied zoology termed ethology (Lorenz 1952). Excited by the idea of imprinting he formulated Attachment Theory, which helped account for external dangers to the child he felt psychoanalysts had wrongly discounted. Attachment is a phenomenon in the animal kingdom, one closely related to what used to be termed the 'survival instinct'.

Even such apparently a mentally unsophisticated animal as the ant is said to form worker-to-queen 'attachment' and can transfer it to a new queen (Alloway and Ryckman 1991). As in lower animals, primate attachment behaviour is partly hormonally mediated and can have lasting effects, playing out with greater and growing mental complexity as the self develops. Harlow showed that proximity-seeking in monkeys was not related to feeding, as Freudians believed (Harlow 1958; Harlow and Suomi 1970) but to an 'innate need for companionship' (Suttie 1935). Bowlby favoured an 'epigenetic' model of development which rests on interaction with the mother (terminology now superceded by 'primary caregiver') (Waddington and Hal 1977). It was a spatial theory, consisting of proximity-seeking, the 'secure base' effect, and separation protest, and results in the development of an 'internal working model' of relationship (Holmes 1993, Chapter 4). This marriage of psychoanalysis and evolutionary biology inspired a voluminous body of work that is now in principle confirmed. The pervasive importance of attachment is generally accepted (Holmes 1993; Schore 1994).

2.5.2 *Experimental confirmation*

Bowlby's proposal was not met with widespread acclaim. Many psychoanalysts felt it dismissed central concepts of internal psychological experience, devaluing their work. However unlike many of their hypotheses, Attachment Theory was open to experimental confirmation. Bowlby conducted and published considerable research but probably the most significant early empirical evidence sprang from the work of his pioneering colleague and some say co-founder of Attachment Theory, Mary Ainsworth, who in the late 1960s devised the 'Strange Situation' test as a tool for assessing naturalistic mother-child interaction (Holmes 1993, 104). From observations of a twenty-minute session of mother and child playing, being introduced to a stranger, parting from the mother and reuniting, three and later four distinct, repeatable patterns of response were identified. Around two thirds of children were termed Secure, and one third each Insecure Avoidant and Insecure Ambivalent, with very small numbers Insecure Disorganised (Ainsworth, Blehar et al. 1978).

Importantly, these categories proved to have diagnostic utility and have become a robust clinical tool. Later, a method that allows equally reliable non-behavioural diagnosis was created, the lengthy Adult Attachment Interview (George, Kaplan et al. 1984/1985/1996). Shorter questionnaire forms that are almost as reliable have more recently become widely available. Prospective studies have demonstrated both that the quality of the maternal relationship correlates with attachment status at one year (Grossman, Grossman et al. 1986; Main and Weston 1982; Sroufe 1979) and that numerous effects on personality can persist into adulthood and even the next generation (Fonagy 1999b; Fonagy, Steele et al. 1994; Murray 2001).

On a physiological level, recent neuroscientific evidence supports Bowlby's assertions that attachment is an instinctive behaviour with a biological function, a control system in the brain regulating affectively driven behaviour. This regulatory 'senior executive of the emotional brain' - the orbitofrontal system and its cortical and subcortical connections - is expanded in the right hemisphere, which is dominant in infancy and centrally involved in inhibitory control. Attachment theory is 'essentially a regulatory theory', and attachment can be defined as the interactive regulation of biological synchronicity between organisms (Schore 2000).

2.5.3 Refinements

2.5.3.1 Criticisms of attachment theory

The normal pattern of infant care across human history and in different cultures is that it is shared within a stable group of adults and older children usually, but by no means universally, related persons and female. Given that in this situation the young child has a hierarchy of attachment figures to turn to, feminists have critiqued Bowlby for his exclusive emphasis on the relationship with the mother, which is seen as a reinforcement of a male dominated status quo that may ironically produce greater insecurity for the child (Holmes 1993). Bowlby has been criticised for using biology to justify the cultural product of 'patriarchal but father-absent' nuclear families which suit the needs of capitalism (Leupnitz 1988). Both points have fed into later work.

Research has examined Bowlby's assertions in detail, and corrected some of them. Brief mother-child separations per se probably do not generally lead to lasting damage, and the state of their relationship before separation is important: the more tension in the relationship, the greater the damage from separation. Antisocial behaviour seems linked not primarily to maternal absence but to family discord (Rutter 1981). But Bowlby's core claim stands: complete maternal deprivation leads to clinging infancy and a restless, attention-seeking child, and; there is what may be conceived as a 'sensitive period' for forming stable relationships from six months to around four years (Tizard 1977).

2.5.3.2 Infants are participants, reacting actively and 'logically' to experience

Children appear to react logically to the degree of reassurance they encounter, becoming less secure if maltreated and more secure if not (Crittenden 1992). It is easier for a child to use a secure mother as a secure base (Posada, Waters et al. 1995). Secure mothers and others who interact with warmer verbal tones and gentler physical interventions gain greater compliance and cooperation than mothers of nonsecure infants, who show the opposite pattern (Londerville and Main 1981). Fearful mothers and those with restricted affect expression influence their offspring to be less emotionally demonstrative and behave less well; greater joyfulness in mothers leads to an easier temperament (Kanaya 1985-1986).

From the outset, the effects are two-way: mothers' mental states and behaviour are also in part responses to their children's personalities. Later behaviour problems have been shown to be more likely even into teenage if the mother suffers from postnatal depression (PND), and

PND is extended with ‘difficult’ children, who also affect adults other than the mother. Counseling helps both mothers and the relationship with the child, seriously reducing later behaviour problems (Murray 2001). Infants’ reactions to attachment experiences may be the expression of an evolved mechanism. Since the main dilemma facing juveniles would have been the trade-off between survival and growth, individual differences in attachment may be attempts to optimise the risks occurring in the environment of human evolutionary adaptedness (Chisholm 1996).

2.5.3.3 Biological motherhood is not essential

Whilst there are undoubtedly olfactory and other signals which help establish and reinforce an innate system for mother-child bonding, it is clear that a ‘blood relationship’ between mother and infant is not as important as Bowlby may have suspected: children adopted in their first few years can form secure relationships (Tizard 1977) and babies can become strongly attached to men acting as primary caregivers (Geiger 1995, 1996). Kibbutz children primarily cared for by the same non-family caregiver tend to develop similar styles of attachment to that adult (Sagi, Lamb et al. 1985; Sagi, Van IJzendoorn et al. 1995). However communal sleeping arrangements can lead to an increase in insecure attachments (Sagi, Van IJzendoorn et al. 1994), presumably because the attention given to these infants is not as great or as personalized. Rather it is the degree and quality of interaction an infant has with a substitute caregiver that governs the child’s behaviour. Infants with highly involved caregivers display the highest levels of contact seeking, distance interaction, and exploratory behaviors in the caregiver’s presence, while infants with low-involved caregivers show the lowest levels of these behaviors and seek more contact and interaction with a stranger (Anderson, Nagle et al. 1981).

2.5.3.4 Embodiment and touch

Direct sensual experience of physical contact with other people has been normal throughout evolution (Cook 1978), is important in helping regulate infant arousal (Brennan, Wu et al. 1998), enhances self-regulation in premature infants (Feldman, Weller et al. 2002) and shows correlations with early attachment behaviour (Lowinger, Dimitrovsky et al. 1995). Autistic children show better social relatedness when massaged regularly (Escalona, Field et al. 2001), and Amazonian tribal infants are carried continuously by one or other parent next to their skin, which has been linked with a markedly calmer temperament in later life (Liedloff 1989). Memories of having received physical affection from parents correlate

with parental warmth, intimacy and attachment, and relates to competent social and emotional development in adolescence (Oleson 1996). Interestingly, infants who do not sleep with their parents develop stronger and more longstanding attachments to inanimate security-objects than those who do (who tend to have breastfed) (Hayes, Roberts et al. 1996).

'Corporeal attachment' has been suggested as a term for the possession of a realistic body image and attitude, and of being sensuously in touch with one's own physicality (Anonymous 2001). The idea that the highest form of environmentalism is to 'love the world as our own body' has been mooted (Loy 1997), alongside the notion that we should be treating the 'world as lover, world as self' (Macy 1991b) to reach such a state.

2.5.3.5 Models of self and other

If attachment behaviour of the adult is predictable from the infant's experience, how does this come about? Bartholomew returned to Bowlby's model in suggesting that underlying attachment status are two mental 'constructs', respectively the internal models of the self and other (Bartholomew 1990; Bartholomew and Horowitz 1991; Griffin and Bartholomew 1994) (though as has been noted, these 'constructs' may be partly innate). This led to a perhaps more satisfactory explanatory model (Figure 2.3) that appeared to offer an ethologically and psychologically coherent account of why these states should arise, and a two-dimensional space within which four distinct types of attachment status can be conceptualized (Griffin and Bartholomew 1994).

A closely related model utilizes the same categories but considers Bartholomew's vertical and horizontal axes respectively to be 'avoidance' and 'anxiety' (Brennan, Clark et al. 1998; Hazan and Shaver 1994; Shaver and Fraley 1997).

Parker separately measured the perceived quality of care and degree of control by each parent using the Parental Bonding Instrument (Parker, Tupling et al. 1979), postulating four types of parenting: neglectful (low care and low control); affectionless control (high control and low care); affectionate control (high care and high control); and optimal (high care and low control) (see Figure 2.4). Optimal parenting indicates that the parent provides adequate affection and accords the young person appropriate emotional independence or allows appropriate emotional independence to develop. Both affectionless control and neglectful parenting have been shown to be associated with antisocial or offending behaviour of youths (Mutale 2000).

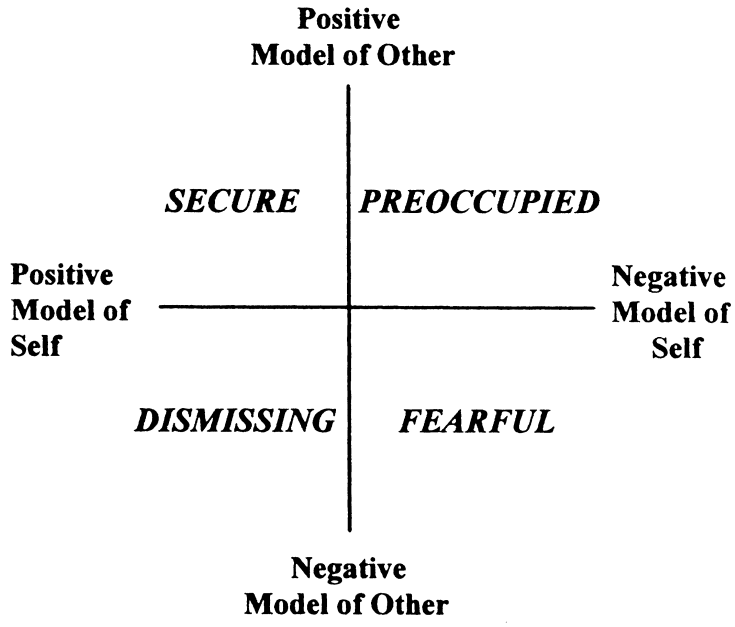


Figure 2. Four-category model of adult attachment.

Source: Bartholomew, K. (1997), p252.

Figure 2.3: Bartholomew's four-category model of adult attachment

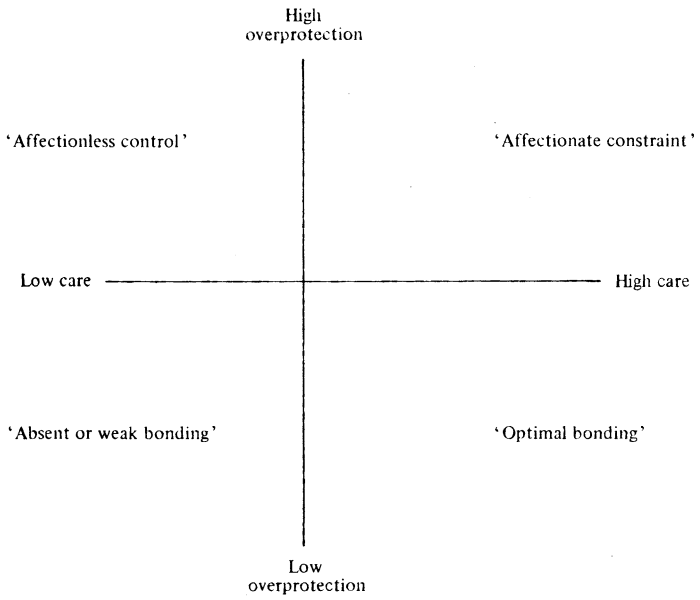


Figure 2. The two scales of the Parental Bonding Instrument showing the conceptualized parental bonding possibilities.

Source: Parker, G. et al (1979), p8.

Figure 2.4: Parental Bonding Instrument scales

Combining these models, the axes equate as follows:

Model >	Internal working model	Avoidance-anxiety	Care-Overprotection
Equivalent vertical axis	Positive-negative model of others	Low-high avoidance	High-low care
Equivalent horizontal axis	Positive-negative model of self	Low-high anxiety	Low-high overprotection

Table 2.1: Comparison of attachment model axes

Debate continues over whether there is a third factor, as revealed in factor analyses (Murphy, Brewin et al. 1997). More complex models and classifications are now being proposed, including the 'dynamic maturational' (Crittenden 2000), alongside the 'lifespan' perspective, which argues that since protective needs extend beyond infancy, attachment is important throughout life (Goldberg, Grusec et al. 1999).

2.5.3.6 Multiple psychologies: The same constructs?

Disparate origins apart, it may be that apparently incompatible theories of personality development as differentiation (from psychoanalysis), attachment and mutuality (as conceptualized by self-in-relation theorists) in fact tap into the same underlying interpersonal and intrapersonal constructs (McKinney-Goss 2000). Certainly there are significant overlaps and parallels between attachment and psychoanalytic theories (Fonagy 1999a) and theory of mind (Fonagy, Steele et al. 1997).

Theorists and clinicians hailing from many formerly distinct schools of thought have adopted its framework, as this chart of the principal influences (Figure 2.5) shows. The initially hostile reception Bowlby received has turned into what may be described as a torrent of approval. Attachment research is now an extremely active and wide ranging enterprise, which has been extended into some surprising fields, as we shall now see.

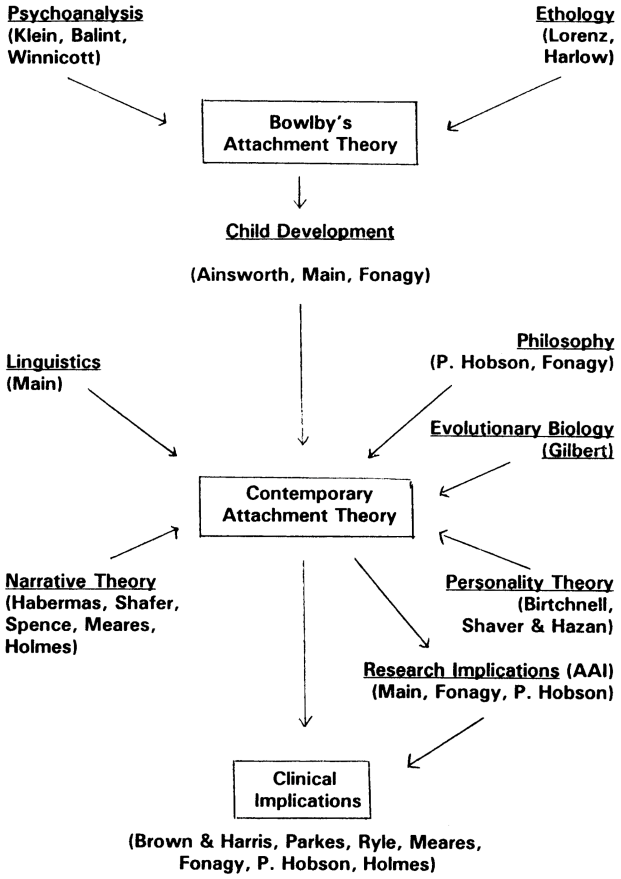


Figure 1. Evolution of attachment theory.

Source: Holmes, J. (1997), p232.

Figure 2.5: Evolution of attachment theory

2.5.4 Extensions

2.5.4.1 Human

2.5.4.1.1 Intrinsic influences

Despite its dependence and need to form attachments, the infant is motivated from birth to seek more than mere care giving from others. Our desire to communicate stimulates us immediately to start learning about the 'intentions, interests and feelings' of others (Trevarthen 2001): motivation which contemporary cognitive theory cannot account for (Trevarthen 1992). Musicality is innate and prelinguistic (Trevarthen 1999-2000), as is a certain morality shaped, various investigators argue, by evolution for greatest gene, personal, or species advantage (Dawkins 1976; Wright 1994).

As the infant matures and establishes influence over itself, experience divides into 'self' - over which it has increasing - and 'other' - over which it has (apparently) diminishing - control. Feedback from exploratory use of its physical and mental faculties - i.e. using and perceiving senses, limbs, the mind - might be termed 'intrapersonal' experience and it is in a sense the rate at which this is allowed to develop and the emotional regulation surrounding it which creates security for the maturing individual self. Whilst, as any primary caregiver is aware, the infant's nascent personality is evident from an early age, it is in a state of 'original innocence'. Attachment experience is determined by whether it is allowed to unfold amid security and without detrimental external interference.

2.5.4.1.2 The first dyad

Most early work on attachment was done with mother-infant relationships (Ainsworth, Blehar et al. 1978, 307), where the mother's presence provides emotional security, encouraging exploratory behaviour (Ainsworth and Bell 1970). Protest-despair reactions to separation correlate with behaviour prior to separation, and the nature of the separation and reunion environments, similar to monkeys (Mineka and Suomi 1978). The wider context also impinges: mothers and their offspring have less fluent nonverbal interaction when living in an unfamiliar culture, precipitating identity confusion and emotional insecurity for the mother (a failure of 'belonging') which is instinctively apparent to the child (Gratier 1999-2000). Given that culture is mainly transmitted via mimicry (Trevarthen, Kokkinaki et al. 1999), this implies that first generation immigrants at least may always be insecure.

Born with the ability to express their emotional states, infants stimulate reciprocal relations with caregivers (Trevarthen and Aitken 1994). Infant temperament therefore affects the infant-caregiver relationship, although there is disagreement about the degree of influence from the child (Miyake, Chen et al. 1985; Sroufe 1985). Compatibility between personalities is therefore a determinant of a relationship. For example, 'highly sensitive people' (HSPs), the 20% of individuals who exhibit particular nervous sensitivity, are more likely to be insecurely attached (Goldsmith, Bradshaw et al. 1986, cited in Aron (1999), 70). Young HSPs may more easily feel overwhelmed and 'frozen' when adults make them uncomfortable, compounding poor communication (Aron 1999, 72).

Hence, earlier notions that attachment status develops consistent with only the child's temperament or those of the principal caregiver have been superceded by those of a dynamic dialogue between the two (Sroufe 1985).

2.5.4.1.3 The next dyad, and the first triad

The father also serves as an attachment figure, but this does not as some claim demonstrate the invalidity of attachment theory (Willemsen, Flaherty et al. 1974). Rather the child inhabits a 'social network' (Weinraub, Brooks et al. 1977) within which it successively builds up attachment relationships, eventually to form a hierarchy of 'friendships' (Trinke and Bartholomew 1997).

Infants are most intimately and strongly attached to their primary caregiver, seeking proximity when in need more often to mothers than fathers (Ban and Lewis 1974). When all three are together, they have complex effects on each other: for instance interaction with each parent, greater with each when alone, may be inhibited (Lamb 1977a). The presence of the father improves mother-child affective interaction, but reduces the mother's playfulness with secure infants (Zaslow, Rabinovich et al. 1988). Together they develop a relational triad (Clarke-Stewart 1978) which cannot be explained dyadically, just as with primate relationships (de Waal and Embree 1997).

How the mother and father jointly run their lives has significant effects: children of working couples are more secure if the mother prefers to stay at home, is maritally satisfied, and considers the child manageable. Children of full-time working mothers are more dependent. Temperamentally easy children attach better to fathers (Payne 2001). Deliberate attempts to generalise attachment away from parents can cause difficulties: kibbutz children who stay with their parents rather than communally are more secure (Sagi, Van IJzendoorn et al. 1994) and adopt their attachment status. Those who sleep in communal houses do not (Sagi, Van IJzendoorn et al. 1997) and may have damaged mother-child attachment (Aviezer, Sagi et al. 1999).

Parental over-control steers the child toward an anxious adulthood (Chorpita and Barlow 1998), and overprotective parenting impedes the facility for self-protection against distress, for example in incarcerated young offenders (Biggam and Power 1998). Using the Parental Bonding Instrument instrument (Parker, Tupling et al. 1979) it has been shown that young prisoners' self-esteem, hopelessness, and suicidal behavior correlates with parental bonding style (McGarvey, Kryzhanovskaya et al. 1999).

It is increasingly recognized that psychological difficulties may be not just problems of individual adjustment but also of models of relationships between others picked up from the context of upbringing: a significant relationship has been detected between family role behavior and a child's interpersonal attachment (Deason 1998).

2.5.4.1.4 Wider and lasting effects

Bowlby argued that early experience does not lead inevitably to later pathology, but feeds into the present context of development. Extremes apart, anxious attachment is not itself a psychopathology but sets in train pathways which are more likely to result in later pathology (Sroufe, Carlson et al. 1999). Attachment as a quality of relationship extends beyond childhood and the specific needs of protection from predation and survival; it serves to protect in times of illness, injury, and emotional distress, even into adulthood (Goldberg, Grusec et al. 1999). Relationships can be transient and emotionally distant, but 'affectional bonds' exist when we maintain contact over time and absence, feel joy on reunion and grief at permanent loss. Since an attachment is an affectional bond, attachment figures are non-substitutable, other attachments notwithstanding. But attachments have something beyond other affectional bonds:

> *'This is the experience of security and comfort obtained from the relationship with the partner, yet the ability to move off from the secure base provided by the partner, with confidence to engage in other activities. Because not all attachments are secure, this criterion should be modified to imply a seeking of the closeness that, if found, would result in feeling secure and comfortable in relation to the partner.' (Ainsworth 1989)*

Nevertheless, the effects of attachment status are wide-ranging and lifelong, and the odds are stacked against children of mothers with poor parenting skills. The most comprehensive study to date of the relationships between child-care, family factors, and early development followed 1100 US children from birth to age 7. The most consistent predictors of children's outcomes were maternal sensitivity, quality of the home environment, and income. Over 90% of 3 year old US children experience regular non-maternal care, with over half getting over 30 hours a week (Allhusen, Appelbaum et al. 2001). This seems to lead to greater confidence, as pre-schoolers who have interacted with strangers are more ready to seek physical contact with novel strangers (Klein and Hewitt 1987).

Attachment status determines peer relationships at an early stage. Mother-infant conflict leads to sibling conflict (Volling and Belsky 1992). Four and five year olds show stable social and emotional characteristics: those with secure attachment histories score higher on emotional warmth, social maturity, and peer popularity, while anxious-resistant subjects have the lowest peer status (LaFreniere and Sroufe 1985), which is not surprising given that feeling secure activates feelings of empathy (Mikulincer, Gillath et al. 2001). Attachment

style may well have lasting effects on the development of children's understanding of other minds (Holder 1996). Dismissing and preoccupied older teenage girls have poorer communication skills and interact less well with their best friends (Black, Jaeger et al. 2000).

Behaviour with romantic partners echoes parental relationships (Roisman, Madsen et al. 2001). Adults visiting significant others - including parents, friends and romantic partners - echo infant attachment separation behaviour (Yankeelov 1996) as do spouses who must part company (Vormbrock 1995). Although insecure relationships are not necessarily unstable; they can endure despite dissatisfactions and abusive behaviour (Bartholomew and Shaver 1998), instability of attachment impacts negatively on mental health (for instance impaired mourning (Parkes 1991)), but also potentially on physical health, as it does on monkey immunity (Coe, Lubach et al. 1994).

On a positive note, whilst early traumatic attachment experiences can lead to extreme effects, they can be counteracted in the secure base of a therapeutic bond. Borderline personality disorder, (BPD) a condition of profoundly insecure attachment, can involve vacillations between a wish for proximity and a dread of engagement (Sable 1997). People with BPD report more alienation, egocentricity, and social incompetence in object relation deficits, view their parents more negatively and are more likely than the norm to be classified as avoidant and hostile (Sack, Sperling et al. 1996).

Establishing an affectionate bond in parent-child and therapist-client relationships is similar to that in intimate partnerships: all three provide a ‘safe’ space to sustain emotional bonding (Karlsberg and Karlsberg 1994). Therapy can also help delinquent children who have had serious attachment disruption through adoption. Brief ‘holding therapy’ includes cognitive restructuring, psychodrama, inner child metaphor, and therapeutic holding (Myeroff, Mertlich et al. 1999). Special needs children also benefit (Myeroff 1997), and changes are still present 2 years after the therapy (Randolph 1997).

2.5.4.1.5 One attachment or many?

It is clear that we develop multiple attachments (Goldberg 1983; Lamb 1982; Mitchell, J. Clyde 1987). Bowlby, sometimes misrepresented on this, specifically denied ever having said that mothering cannot safely be distributed among several figures (Bowlby 1969, 303). As the first year progresses into the second, infants may develop several attachments including to father, siblings and grandparents, depending on who cares for them. Rather we need ask whether the attachment style established with the primary caregiver ‘locks in’ a pattern for later attachments. The converse notion is more complex: that the child can

establish differentiated attachment styles with different people. It seems the answer is mainly the latter, with qualifications.

Attachment experience is consistent according to the caregiving adult: siblings brought up by the same mother tend to form similarly secure or nonsecure relationships (Van IJzendoorn, Moran et al. 2000), but experiences with mother and father are dissimilar, and they have different effects on infant personality development (Lamb 1977b).

In the absence of healthy parental attachment, the presence of at least one competent and emotionally stable person who is attuned to child's needs and with whom it can form a close bond is protective (Werner 1995), since that relationship can become a preferred model for later relationships. In this way, abused children can escape intergenerational cycles of abuse and become model parents, a phenomenon termed resilience (Fonagy, Steele et al. 1994). Even in narrowly numerical terms, this is why traditional societies are likely to provide better protection against attachment insecurity, since multiple alternative attachment figures are constantly available. The child can maintain many and turn to the one that feels best in any given situation – indeed this is the evolutionary norm. The extended family is one step less ideal than this, and the isolated nuclear family inevitably more risky still.

But can the qualities sought in an ideal 'loving' relationship be provided through other, perhaps non-human means? In other words, is it possible to obtain 'resilience' from non-human sources? Can a pet give the unconditional love that it is known can later be protective against the perpetration of abuse? Can security be attaied through other means: secure identity within a community, or the security of intimately knowing and 'owning' or 'belonging to' a place? Arkow suggests that many children 'who live in violent households seek solace in their pets as islands of kindness in the chaos roaring around them' (Arkow 2002a). The notion of resilience through connection with inanimate nature has been mooted (Stephens 1999).

It may be that non-human attachments are present in normal attachment hierarchies. It may also be that they can act as compensation for inadequate human care. The effects of a 'good' relationship with a non-human figure may even flow *back into* human relationships.

2.5.4.2 Attachment to all sentient others?

The concept of attachment has now been extended to applications beyond interhuman relationships to include other sentient creatures, most rigorously to research on relationships with pet animals.

2.5.4.2.1 Interspecies relationships are normal

Close behavioural associations with non-human animals are common, historic, useful, and probably co-evolved. Species communicate across the species barrier (Smith 1999) and develop attachments, relationships between sheep and dogs having been noted 40 years ago (Cairns and Johnson 1965). Bonding between sheep, goats and cattle strengthens with time and is used to limit predation (Hulet, Anderson et al. 1991; Hulet, Anderson et al. 1987; Hulet, Anderson et al. 1989). Sadly even a motherly lioness cannot prevent her fellows regarding infant antelopes she adopts as lunch (Astill 2002). Scientists bond with experimental subject animals, bonds which also affect the animal (Davis 1993), rendering swathes of past research of doubtful value. In the field or laboratory this can result in profound behavioral and physiological changes relevant in research fields ranging from the biomedical (e.g. heart rate, blood pressure, and immunological changes) to animal sciences (e.g. growth and production) and in species ranging from primates and dogs to chickens, reptiles, and even octopuses (Davis and Balfour 1992). Possible scientist-animal relationships include dominant-subordinate, parent-offspring, predator-prey and potential sexual partner (Estep and Hetts 1992). Scientists who bond with an experimental animal may feel a special responsibility to that animal or may wish altogether to avoid research in which bonding occurs (Lehman 1992).

A compelling reason to accept the normality of close human-animal relations, at least with respect to dogs, is the antiquity of the relationship. Archaeological evidence points to domestication around 10- to 20,000 years BME (Brisbin Jr. and Risch 1997). Recent genetic evidence puts it at 100,000 (Mlot 1997; Vila, Savolainen et al. 1997) or even 400,000 years (Eliasi 2002). This cooperative association has probably influenced our own evolution (Marschark and Baenninger 2002) and may even account for our success (Ananova 2002). Understanding the habits and mind of prey and predators was useful to early humans, and hunting may have become more efficient by cooperation with and domestication of dogs, bringing additional benefits like protection, companionship, emergency nutrition (i.e. insurance), extension of the senses into animal realms (i.e. education).

Animal imagery is among the earliest known human artifacts, and effigies of animals have played and continue to play a critical role in cultural symbolism, dreams and folklore (Shepard 1978; 1996). Levinson (1972) argues that ‘Man has not changed essentially over the last million years... (and) most men have a need to associate with animals’. The ethologist Konrad Lorenz (cited in Levinson) claimed a need to associate with animals, and equated the need for the companionship of his dog to a bond with nature.

Despite this, and a flow of scientific evidence to the contrary emerging from the turn of the nineteen-seventies onwards, accounts as late as 1978 appeared to characterize a close emotional bond with a pet as pathological. Although the mutual need for attachment is acknowledged, Rynearson suggests that abnormal developmental frustration can cause a child to 'displace attachment needs onto the pet'. This 'defensive' relationship can create enduring psychiatric reactions if interrupted (Rynearson 1978) – but so can the sudden loss of any close individual. Dissociative Identity Disorder (a psychiatric term related to schizophrenia and multiple personality disorder describing detachment from current events and psychic disowning of experience, involving decreased concentration and memory, and considered a defense against unbearable emotional turmoil) may characterize individuals highly attached to pets. Parental neglect or rejection may precipitate particularly strong pet attachment and even subsequent vocational orientation (Brown and Katcher 2001).

Pet attachment is significantly correlated with dissociation and absorption (the most benign nonpathological element of dissociation, involving imaginative involvement such as daydreaming), and high nature attachment is significantly related to absorption. Two fifths of those with high pet attachment have clinical levels of dissociation. Pet attachments may provide a compensatory relationship for people with histories of trauma. An attachment to nature may be indicative of seeking an experience of sensory absorption, but not a 'personal' relationship (Brown 1997, 2001). It may be that there is a degree of attachment to the non-human that is unhealthy, but this perspective risks throwing out the baby with the bath water. Brown and colleagues do not appear to accept the notions that it may be a positively healthy coping response for a child deprived of 'good enough' human attachments to turn to a pet or nature, that relationships with non-human animals or places may in themselves be good for you and qualitatively differentiated from inter-human relationships or, more radically, that attachment to animals and nature more generally may be a prerequisite of sanity (Shepard 1982). One author believes that pets are temporary substitutes – 'transitional objects' – in the maturing mind of the child which, though they may be pragmatically useful in the maturational process, hold no unique position in it nor necessarily have any longer term effects particular to them. '…pet animals are for many people another step in the progressive differentiation of self from other.' (Klein 1997, 250). The unfortunate but logical extrapolation of this argument being of course that the complete obliteration of human experience of nature would have no ill effects on us (though it may be that this was not the intended implication).

Pet keeping is in fact a culturally universal phenomenon, although its means of expression varies (Brown 2002). Midwest US pet ownership is associated with large, intact, affluent rural households, whereas companion animal bonding is higher for adults in small

urban, divorced families (Poresky and Daniels 1998). More than one in four Indiana schoolrooms have a class pet: 72% of classrooms have pets, and 46% of classrooms without pets allow students to bring in their own. Animals found include: Mammals (including Chinchilla, Gerbils, Guinea pigs, Hamsters, Mice, White rats, Hedge hogs, and Rabbits), Birds, (e.g., Parakeets), Reptiles (including Anoles, Iguanas, Legless Lizards,) Snakes (e.g., Corn, Boa constrictor, and Garter), and Turtles (including Box turtles), Amphibians (including Salamanders), Frogs (including African and tree frogs), and Toads, Fish (including guppies, Goldfish, Beta, and basic tropical fishes), Insects, (e.g., Ant farm, Butterflies, Caterpillars, Cockroaches (including hissing), Crickets, and Mealworms), Invertebrates (including worms), Hermit crabs and Crawdads, Sea anemone, Snails, and Spiders (e.g., Tarantula). Animals motivate students to behave better and provide opportunities for care giving, a strong reward for working well in class (Rud and Beck 2000). Children who have pets talk about them, have contact with others' pets, enjoy animal-related school assignments, movies, television, books and zoos more than those without. Boys read and watch television about animals more than girls. Of all school age groups, middle schoolers have more animal contact and like pets best. Less than one in thirty has no contact with animals or animal-related information (Kidd and Kidd 1990).

This is important since ‘what is experienced as … vital to the self determines one’s spontaneous “field of care.”’ (Myers Jr. 1998, 16) Adults who had pets when they were children have more positive attitudes to pets now. The younger the child encountered a pet, and the closer they were to it, the more sympathetic they are (Poresky, Hendrix et al. 1988). Pet owners and non-owners do not differ in personality, but may differ in attitudes (Johnson and Rule 1991). Dog owner’s choice of breed may correlate with their personality (Notarangelo 2000).

The role pets fulfill changes with age. They are for all children more significant in understanding relationships than for adults, and seem particularly important for certain children. A novel approach accessed such conceptions by hypothesising that in children’s drawings, distances between figures represent emotional distance. Fascinatingly, as children become older animals in their drawings move closer, and family members – at first nearest – move further away, eventually to be displaced by pets. Cats, dogs, caged and farm animals are placed significantly closer to self-figures than fish, and older children are more likely to draw themselves holding an animal. Whilst pet owners and non-owners are equally emotionally close to family members, for owners pets are even closer (Kidd and Kidd 1995). Taken literally this suggests that pets are significant others at critical phases of child development, at times more important than humans, and in normative, not just pathological, situations. One accessible stereotype here might be the young teenage girl who ‘loves’ her

pony (there is of course the possibility that closeness to animals may be an effect of child 'ownership'). Kidd and Kidd's conclusions might also be taken to support certain other notions:

- Children constellate their relationships differentially: they know which relationships are close and which less so - and animals are actors in that drama;
- Pet owning children have a greater *number* of close companions with whom they interact;
- Children with pets encounter more *types* of 'personalities' with which to interact;
- During the transition from infancy to middle childhood, pets move from being less significant than family to more so;
- Owners and non-owners draw family members at similar distances, but owners draw pets between themselves and family. Hence the latter see themselves as closer to their pets than humans in absolute terms: their subjective experience is of closer relationships.
- Children construct a phylogenetic hierarchy at least partially on the basis of emotional identification.

Kellert distinguishes three domains of children's experience of nature: direct, indirect and vicarious or symbolic (Kahn Jr. and Kellert 2002, 118; Kellert 1996). Direct experience is defined as largely unplanned play involving physical contact with natural settings and nonhuman species that are outside and independent of the built environment and apart from continuous human input and control. Indirect experience is defined as physical contact but in programmed and managed contexts where nature is subject to deliberate and extensive manipulation, such as gardens, zoos and aquaria. Included in this category are 'related but different' contacts with domesticated plants and companion animals. Finally, vicarious or symbolic experience is encounters with representations of nature that can be realistic but may also be metaphorical or stylised – formerly mainly in print media (and dating back to cave paintings, totems and preliterate oral tradition) but increasingly through electronic means (Jung 1990; Levi-Strauss 1966; Mithen 1996; Shepard 1978, 1996).

Though this categorisation is useful, it perhaps too readily leaps to clean distinctions, for instance over domesticated animals. Cats, dogs, horses, birds and fish are seen as wholly under human control, connoting an extinguishment of their 'essential wildness'. 'Direct'

experience of wildness one might have with a wild animal is assumed to be more genuine than the cowed (sic!) animality one might have with a pet (and seeing animals in the wilderness contributes significantly to the perceived psychological value of such experiences (Fiedeldey 1994)). Many pets are the product of selective breeding and behavioural manipulation, but distant observation of a wild animal could be classed as a 'vicarious' experience, the true nature of the animal remaining forever ineffable, whereas the lasting, deep and dynamic relationships many establish with companion animals could be seen as a much more 'direct' and genuine encounter with otherness. There are proven distinctions between the quality of experience that can be had with familiar (Zasloff 1996) and unknown (Eddy 1995; Lowe and Bradshaw 2002; Mitchell and Thompson 1990) animals.

2.5.4.2.2 'Companion animals' engender health

Pets have multiple impacts on wider measures of health. Pet attachment is positively correlated with physical health (Dembicki and Anderson 1996; National Institutes of Health 1987; Serpell 1991) (although some contrary evidence has been found (Budge, Spicer et al. 1998)) and mental health is improved, for example in the elderly (Dembicki and Anderson 1996; Garrity, Stallones et al. 1989)). Just as with mothers and infants, compatibility between pet and owner matters. People who are more physically, behaviorally and psychologically compatible with their pets report better mental health and fewer physical symptoms, independent of their level of pet attachment and human social support (Budge, Spicer et al. 1998).

Pets supply ongoing comfort, opportunity for nurturance, and reduce loneliness (Sable 1995). Pet owners tend to be more physically active, have lower blood pressure, lower cholesterol and survive heart attacks more than non-pet owners (Riverdeep Interactive Learning 2001). Dogs act as a social lubricant and source of humour between humans (Kenworthy 1997). Senior citizens who have a pet are more active and suffer less deterioration in coping (Raina, Waltner-Toews et al. 1999). A pet supplies companionship, affection and protection, and makes them more alert, visit the doctor and suffer from depression and loneliness less. Alzheimer's patients exposed to aquaria are more relaxed, alert, have a better appetite and attention span (Riverdeep Interactive Learning 2001).

Animal therapy promotes empathy and nurturing; encourages socialization; and provides non-threatening physical and emotional contact (Riverdeep Interactive Learning 2001). Suggestions that raising pets promotes self-esteem (Levinson 1978) have been confirmed (Triebenbacher 1998). Wider emotional benefits including higher levels of self-concept, self-esteem and autonomy in pre- and early adolescence (Covert, Whiren et al. 1985; Davis 1987;

Davis and Juhasz 1985; Van Houtte and Jarvis 1995) and better distress coping (Taggart 1997) have been demonstrated. Pets are seen as special friends, important family members, and providers of social interactions, affection, and emotional support (Triebenbacher 1998). Children with pets are better socially integrated, have wider social networks, and are more popular with their classmates (Endenburg and Baarda 1995). Girls have stronger pet bonds than boys, and closeness of girls peer and pet relationships correlate, but do not differ between owners and non-owners. Petless boys relate less well with peers (Angle 1995).

In pre-adolescence a pet is a developmental resource, seen as both responsibility and friend, though the nature of child-pet relationships shifts according to the demands of development. Indeed a static relationship between pet and child would be cause for concern (Brown, Richards et al. 1996). Just as with humans, human-animal relationships can have a maturing dynamic narrative, of which a sensitive human may be aware. In Wuthering Heights, Emily Bronte portrays the dog as a scapegoat, and is aware of connections between animal abuse and domestic violence. In her own life, Bronte tells of her mastiff, Keeper, with whom she struggled at first, before the relationship became one of caring. After her death, Keeper may have acted as a bridge to other humans as he mourned his own loss and comforted others in theirs (Adams 2000). Early pet involvement enhances adult empathy for other human beings (Paul and Serpell 1992).

How does this come about? Parents, teachers and peers often make acceptance and approval conditional; pets' affection is unconditional (Masson 1997). The preadolescent's need to develop a positive self-concept and feel valued by a close friend may drive the interaction (Angle 1995). Pets can play a critical role in providing self-object functions, particularly in an impoverished or exploitive environment: this is known as the 'stand-in' interpretation. Unresponsive pets provide their own special difficulties (Alper 1993). One is tempted to speculate on how a pet's own mental health may be affected, particularly for example whether an orphaned (particularly young) pet may be changed by participation in a human family.

Pets are important for the mental well being of many homeless people (Kidd and Kidd 1994). Petting a dog reduces stress, but it's not just the dog: the relationship matters. Greeting a known dog raises blood pressure more than an unknown one, petting it reduces blood pressure still more (Baun, Bergstrom et al. 1984). Perceived social support improves the lot of cardiac rehabilitation patients, although not necessarily a novel but friendly small dog (Craig et al 2000). Cat owners believe they receive affection and unconditional love (Zasloff and Kidd 1994). Fifty-seven percent of owners would prefer the company of their pet to another human on a desert island (Riverdeep Interactive Learning 2001).

Candidate explanations for associations between pet ownership and health include:

- Pets could have either direct physiological effects or mediatory relational effects. In the latter case, for example, early exposure to pets (Ownby, Johnson et al. 2002; Platts-Mills 2002) or a farm childhood (Ernst and Cormier 2000; Kilpelainen, Terho et al. 2000; Von Ehrenstein, Von Mutius et al. 2000) reduces later asthma and allergies;
- Pet ownership could facilitate person-to-person relations, or;
- Health could be a consequence of other factors that covary with pet ownership (Collis and McNicholas 1998).

It may be that 'being in relation' with another sentient being is in itself healthy (Collis, McNicholas et al. 1993). One might therefore postulate that those who live alone and have little social life would proportionately benefit most from the acquiring of a pet, and that those already living amid a complex of relationships – say in an extended family – would, all other things being equal, exhibit the least effect.

2.5.4.2.3 Animal attachment and its consequenses

Human-pet bonding is multidimensional, characterized by emotional-psychological, social, behavioural, and commitment dimensions (Johannson 2000). Three aspects have been distinguished: (1) emotional bond/affectional tie, (2) physical proximity, and (3) caretaking (Triebenbacher 1999). People develop attachment relationships to pets (Endenburg and Baarda 1995; Melson, Peet et al. 1991), and numerous authors analysing human-pet relations in the attachment framework (e.g. Melson, 1989; Johnson et al, 1992; Marks et al, 1994; Sable, 1995). The dog-human affectional bond, in particular, can be characterised in such terms (Previde, Custance et al. 2001). Both attachment and social support theories are required to explain the pets' role (Stammbach and Turner 1998; Stammbach and Turner 1999).

Attachment to companion animals is normal for children (Melson 1990; Melson, Peet et al. 1991; Stevens 1990), for adults (Marks, Koepke et al. 1994; Poresky and Daniels 1998; Stallones, Marx et al. 1990) and for the elderly (Cookman 1996; Garrity, Stallones et al. 1989; Raina 1996; Stallones, Marx et al. 1988), contributing to emotional and social well-being, offering comfort, reducing loneliness at stressful transitions and providing

opportunities to nurture others across the whole life cycle (Sable 1995). For example, newly dog-owning children are visited more by friends and engage in more leisure activities at home together. Attachment to the dog increases confidence and decreases tearfulness (Paul and Meyer 2001). Dogs may act as 'transitional objects' for the drug dependent (Charnaud 2000) (though this author might prefer the term 'transitional subjects'). The course of grief when a pet dies is very similar to that of human loss (Archer and Winchester 1994). Children grieve more than adults (Jarolmen 1998), girls tend to be closer and the closer the child was to the pet, the worse the grief (Brown, Richards et al. 1996). However, pets are helpful in overcoming grief (Adkins and Rajecki 1999). Those who cannot spent much time with their pets, like working women, find them less therapeutic (Watson and Weinstein 1993). Pet attachment is greater for children whose mothers are employed (Melson, Peet et al. 1991), the implication being that when parents are less available, pets act as 'supplementary attachment figures', as they can for older people (Keil 1991).

The parallels between attachment to fellow humans, attachment to pets, and the potential for wider circles of attachment to other sentient and non-sentient phenomena are too stark to ignore. Our intimate and multiple psychological associations with nature and natural phenomena are at least as old as consciousness and, it can strongly be argued, as old as life. Cricitally, they may be non-substitutable. While sharing human attachment qualities, human-pet relationships are different and supplementary, the therapeutic effects occurring independently of other social relationships (Sable, 1995). In a note of caution, Dehasse suggests that interspecies attachment is weaker than intraspecies, since it is easily acquired but requires reinforcement to avoid de-socialization, is not generalisable to all individuals of the species, and has a threshold of socialization that depends on the species concerned (Dehasse 1994). We will critically examine these assertions.

Pet owners are keenly aware of their animal's levels of playfulness, confidence, affection, excitability, activity, friendliness to strangers, intelligence, and owner- directed aggression. Less attached dog owners are dissatisfied with its behaviour, but weakly attached cat owners are unhappy with how much affection they get (Serpell 1996). It may be that just as with other people, humans can have poor relationships with pets and, crucially, the owner's attachment status spills over from one relationship to the other.

Those who choose their pet dog themselves bond more closely with their animals (Kogan and Viney 1998). The more attached a family is to its pet, the more likely it is to take it with them when moving home (Chumley, Gorski et al. 1993). The more emotional investment a farmer has put into his or her livestock, the more negatively they view predators (Vitterso, Kaltenborn et al. 1998). Owner attachment status characterises the psychological effect of

owning a pet: fearful owners are closest to their pets, less depressed and more satisfied with life compared to non-owners. Preoccupied owners are more depressed (Taggart 1997).

Dog owners are more empathic and prosocial than non-owners, and dog owners and cat owners more attached to their pets than owners of other kinds of pets. Children who scored higher than average on the attachment to pets scale showed significantly higher scores on the empathy and prosocial orientation scales than non-owners and lower attachment children. Children with higher levels of pet attachment also rated their family climate significantly better than children with lower attachment to pets (Vidovicet al 1999).

Being hit or being given away are common sub-abusive behaviours that harm companion animals. Giving up a pet to a shelter is emotionally difficult (DiGiacomo, Arluke et al. 1998). People can be both attached and maltreaters: mothers' kindness to their children's pets is associated with adults' attachment to animals, but not to the likelihood of hitting pets. Adults whose parents gave away their childhood pets are more likely to give away their own. Since males are, it is claimed, more influenced by their fathers' attitudes, and females by mothers, same-sex parental modeling may account for intergenerational continuity of attitudes and behaviours to animals (Raupp 1999).

Animal and child abuse are correlated (Clifton 1994a, b; Gray 1996) and the public are aware of it (Raupp, Barlow et al. 1997) though no causal link has been identified (Arkow 2002a). Children who significantly abuse nature, particularly willfully harming animals, are far more likely to be violent adults (Felthous and Kellert 1987; Kellert and Felthous 1985) and approve of violence (Flynn 1999). Child abuse of animals can signal an inability for a child to empathize; witnessing animal maltreatment may desensitize the child to violence (Arkow 2002a). Serial killers often have a history of personal abuse and abuse of pets by parents, and themselves abuse animals though, clearly, all animal abusers do not kill humans. As early as 1905 Freud had suggested that childhood animal cruelty can be a precursor to cruelty to humans (Beck and Katcher 1996; Lockwood and Ascione 1998). There is hope that this is not an inexorable course, however. Guided peer befriending and group empathising as in the ‘Circle of Friends’ initiative can markedly reduce antisocial behaviour in middle-school children (Neustatter 2001), behaviour which often stems from the child’s home environment.

Abusive acts seem to be the victory of the need to retaliate against repression over the intuitive sympathy for subjectivity in the other. So why should intuiting subjectivity in the non-human (or even the non-related) elicit non-violence? Because in general animals do not act aggressively to humans? Because of the empathic insight into the capacity to suffer? These are as yet unanswered questions.

2.5.4.2.4 'Family ecology' and the community

Though it is not the principal concern of this thesis to analyse in detail what children learn about nature from their wider culture and how they negotiate between those human ideas and their own experience, a brief word is appropriate.

Hinde claims that: 'The most important part of our environment is our social environment: our personality is shaped by how we perceive others to perceive us…' and that: '… our social behaviour involves complex negotiations with our social environment – a dialectic which brings a new social truth.' (Hinde 1998, 13) see also Backman (1988), Hinde (1997). This echoes the 'bootstrapping' hypothesis for the acquisition of culture, which suggests that cognitive skills emerge through early social interactions. Infants learn how to interact and understand others in their first few years, skills they then use to learn about culture. But such learning enhances cognitive skills: ultimately, therefore, socialization into culture both facilitates and is facilitated by the acquisition of cognitive skills (Messer and Collis 1996).

Of all the wider impacts on the child, interactions within the family itself are known to be critical - 'family ecology' is one of the three major domains of attachment risk, alongside the child's own characteristics and parental management and socialization (Greenberg, 1999; Greenberg, Speltz, & DeKlyen, 1993). But stresses outside primary relationships can also diminish parents ability to foster secure attachment (Spieker 1986). Keller identified 5 distinct patterns of problem behaviour at age 3, but attachment security alone did not predict later problem behavior: children had to be at risk in other areas (Keller 2001). Difficult circumstances like maternal illness do not necessarily cause lasting harm: contextual risks including family functioning, home environment, social status and adverse events are better predictors of social competence. Attachment status in such families relates directly only major depression (Seifer, Sameroff et al. 1996). Critically, contextual risks mediate the relation between maternal depression and child behavior problems (Cicchetti, Rogosch et al. 1998). In other words, social policies like the poverty alleviation, improving housing and tackling 'neighbours from hell' may prove to be not just short-term expedients but may pay off with a reduction in intergenerational transmission of insecurity.

In fact the child is inescapably embedded in and motivationally engaged with nested systems offering progressively less personalised relationships. In Bronfenbrenner's characterisation (see Figure 2.6), as usual the non-human world does not merit theoretical mention despite his own description of a childhood spent largely in the bucolic grounds of a rural psychiatric hospital in which it would be difficult not to conclude that it played a part

(Bronfenbrenner 1979). Undoubtedly each of these systems – and the uniquely human processes within some of them - plays an influential role in shaping the ideas we hold, but the contention herein is that given their early and primal nature, attachment relationships are probably the *most* significant element.

Notably, therefore, there appear to be differences in the proportions found of each attachment classification between cultures, and expectations of a 'good child' (Harwood, Miller et al. 1995), appropriate maternal and paternal behaviour (Carlson 2001; Onishi 1997) and wider personality factors (Berry, Poortinga et al. 2002). Indeed, cultures vary in many wider psychological dimensions, a field of study known as psychological anthropology (Bock 1994; Schwartz, White et al. 1992; Shweder 1991). Incidentally, this demonstrates that attachment requirements are not sufficient wholly to explain childhood learning.

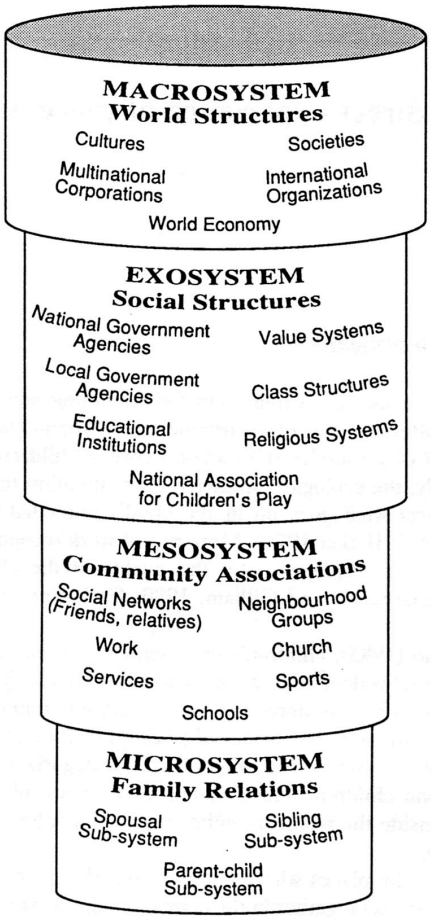


Figure 2.1 The environmental systems of childhood: an ecological framework (Based on: Bronfenbrenner, 1979)

Source: Matthews (1992), p8.

Figure 2.6: Bronfenbrenner's microsystem-macrosystem model

In all cultures, children encounter mediated nature not only directly through cultural structures (e.g. national parks, zoos, botanic gardens, gardens in suburbia, pet-keeping and sentimentality, landscaping in parks, work and public places, interpretative displays, museums, litter, prestigious architecture versus neglected slums) but also indirectly through cultural practices (e.g. media (e.g. television, magazines, books, imagery in cartoons, natural history programmes, incidental images of nature in news, drama, etc.), political (e.g. consumerism) and religious ideology. Clearly, the types and relative amounts of each of these will differ radically widely for children brought up in modern urban industrial, agricultural or gatherer-hunter surroundings. But for children, all experience of cultural meanings is necessarily mediated.

2.5.4.3 Attachment and the non-sentient environment

Investigators have for some decades claimed to detect the salient features of attachment in relations with animals lower in the phylogenetic hierarchy, with plants, places and even inanimate objects. This begs the question of whether attachment must be a bidirectional process: if a tree, house or blanket is not sentient, surely it cannot contribute to attachment relations? Conversely, if infants and adults exhibit behaviour toward the non-sentient that uncannily mirrors interpersonal attachment, perhaps it ought to be characterised as such, and theory must be revised to accommodate this. Are attachments to the non-human always mediated through the human?

2.5.4.3.1 Attachment and lower animals

There is obvious difficulty in deciding how to categorise 'non-sentient' animals, given that prevailing evidence suggests a continuum of consciousness. Many animals of little consequence to human mental life may be in a limited sense 'sentient' if this is taken to include intraspecies communication, planning or some understanding of the presence and knowledge of others - which would include for example birds who learn to pick at milk bottle lids or detect deception by others, and the well-known mimicry of crows and parrots, but could also by extension encompass termite behaviour.

Given this, it might be helpful to coin a new term, 'anthroposalience', to capture the degree to which animals (and other phenomena) are meaningful to us. Perhaps one indication is a disproportionate literature on the subject – there are fewer published studies on attitudes to invertebrates (Ingold 1986; Kellert and Wilson 1993) and their awareness (Sherwin 2001) than on vertebrates.

Pet keeping in the west is heavily biased toward dogs and cats. Keeping smaller mammals, birds, fish and reptiles is not uncommon, although owners show progressively lower attachment scores (Zasloff 1996). This may be related to differences in the extent to which animals 'mirror' human purposes, interests and feeling. Nevertheless, there is clearly some ongoing fascination to interacting with wild creatures that draws us back: feeding birds is popular and a readily sustained habit among the young (Beck, Melson et al. 2001), and children form close emotional bonds even with snakes (Anonymous 2003).

2.5.4.3.2 Attachment and plants

Beyond primary physiological reactions to colour (red agitates; green calms) and the alleged biophilic response of attraction to plants as an indicator of food and water, can we become 'attached' to plants? The notion may startle many academic psychologists, but it is not surprising to many gardeners, farmers, botanists, foresters and forest-dwellers, pagans and assorted others, some of whom might even say that 'not only do I care for the plants, *but they care for me*.'

The pre-eminent student of human-plant interaction is Diane Relf of the US People-Plant Council, who has compiled a database of the very substantial literature. Plants intertwine with the roots of culture (Balick and Cox 1996) and our evolution, and have influenced language, art, and literature. Cultivating plants shaped civilization, and the search for plants guided early exploration. Beyond material outputs, vegetation brings numerous psychological, sociological, and physiological benefits to individuals including children (Rae and Stuber 1976), office workers and the elderly. Horticultural therapy is used in hospitals, geriatric institutions, physical rehabilitation centers, drug rehabilitation programs, and correctional institutions (Lewis 1996). Horticulture brings communities together, increases pride and improves depressed neighbourhoods (Relf 1992a, b). Both children (Francis 1995) and adults (Francis and Hester 1994) find meaning in gardens, and they are described by gardeners themselves variously as paradisiacal, providers, teachers and healers (Olwell 1990). There is a risk of misattributing human reactions to vegetation itself when in fact they are to its being a proxy for climate, geology (i.e. soil), topography (e.g. aspect) and even human action and interaction, but this point seems uninvestigated.

However the special case that, by virtue of their size, longevity and prominence in the literature, trees seem to occupy in our consciousness may throw some light. Householders value them highly (Schroeder and Ruffolo 1996), many view them as sacred or spiritual (Dwyer, Schroeder et al. 1991; Foucault and De Foucault 1993; Van Beek and Banga 1992), see them as models for health (Hoffman 1998) or worship them (Doornewaard 1992). They

are bound up with lore and legend in many cultures (Aburrow 1993). People will risk their lives (Weber 1989), devote their lives to planting (Giono 1995) or hold 'conversations with' (Kaza 1993) trees. Visiting arboreta brings pleasures like aesthetic beauty, tranquility, pleasant moods, escape from the daily routine and urban congestion, and contact with natural processes (Schroeder 1987). Accessible woods have potent psychological value as destressors and are sought after as sites for leisure and exercise (Bussey 1995; Kassioumis 1981). City authorities realise they provide aesthetic, psychological, climatological and pollution benefits (Jim 1987) and foresters have been told that to do their jobs properly they must understand their non-rational value (Mitchell, Force et al. 1993; Vining and Schroeder 1987). That replanting forests is desirable since it will bring both social as well as environmental benefits is a message the public hears and accepts (Hill 1998b). Some hate them (Frost 2002), but plastic substitutes cannot inspire the same reactions (Iltis 1973). Humans may have a propensity for metaphor or 'blended meanings', and are therefore capable of lending 'personality' traits to inanimate objects, but this last finding does suggest that for plants at least, their real qualities matter.

Among the most telling evidence is that those who grow up in rural areas as adults prefer natural forests, whereas urban dwellers prefer developed parks (Schroeder 1983) which suggests at very least a developmental habituation effect. But whilst there is much research on emotional reactions to plants and trees, there appears to be little or none on the specific issue of attachment relations, except that which uses the term in a colloquial, metaphoric sense (Barnes 1999; Bernhardt 1993), leaving open the possibility of further investigation.

2.5.4.3.3 Attachment and inanimate objects

Inanimate objects can be the focus of 'attachments' too, and not just for the young. Blankets can act as reassuring 'transitional objects' for infants, who play more readily in their presence (Passman and Weisberg 1975) and may be attempting to make up for insufficient bodily contact (Cook 1978). It may be that such 'attachments' are in fact more like 'addictions.' But the attachments that the senile can develop to inanimate objects is comparable (Leger, Garoux et al. 1986), and in adulthood the phenomenon of owning items of 'sentimental value' is universal – or is it? Some indigenous peoples own very little and are said not to vest special store (e.g. personal security?) in personally owned inanimate objects (although this author has not encountered evidence of any culture where collective objects do not carry some meaning), but they tend to be in situations where they are (presumably) relatively settled and their practical needs are fulfilled by their surroundings.

Animal toys seem to be a special case in that they are inanimate 'pretending' to be animate. Infants establish favourite animal toys as early as 3 months (Busch 1977) to which they turn at times of stress seemingly to regulate their emotions (Steier and Lehman 2000) in a striking echo of the way they use their mothers (although mothers are preferred from birth). Infants from one year old know the difference between real and toy animals, and prefer dogs to cats. Boys are more attached at that age; girls overtake them by age 2 (Kidd and Kidd 1987). Children can of course have what has been termed 'sensitive companionship' with dolls and imaginary friends, but no mother will be unaware that they are less than happy with substitutes for their favoured choice (Gunnar and Stone 1984). Their ongoing attraction even into late adolescence may be testimony to the fact that toys partially satisfy attachment needs (Humphrey 1987).

2.5.4.3.4 Attachment and the built environment

Whilst the built environment cannot by definition have had exact evolutionary impact on our preferences, the homes, suburbs, work and social settings we create nevertheless both externalise ideas and predilections we hold, and have a curiously self-referential impact on our psyche. People living in run-down slums may feel depressed about their surroundings: grand civic buildings may engender public pride. The pre-eminent architect of the twentieth century, Frank Lloyd Wright, strongly believed that the 'atmosphere' created by the place in and the things with which a person lived shaped their character – whether they are conscious of it or not (McCarter in Palmer 2001, 155).

Whilst people differ in their desire to control the natural environment (Jorgenson 1978), it seems instinctive to construct shelter from locally available materials, leading to a plethora of vernaculars (Kahn and Easton 2000; Oliver 1997; Rudofsky 1981). Our personalities are reflected in our houses, their décor (Cooper Marcus 1995; Gosling, Ko et al. 2002) and our gardens (Bhatti 1999; Bhatti and Church 2000; 2001). Fashions in housing architecture follow the zeitgeist – from Le Corbusier's people-denying (Brockman 2002) phallic, machine-like skyscrapers in a milieu of futurism, through post-war one-size-fits-all utilitarian boxes to the post-industrial critique (dating back to at least a century to Geddes) (MacDonald 1992; Meller 1994) of urban centres as having failed human scale needs and declining in quality of life (Baldassare and Wilson 1995). If we do not yet know whether the 'concrete jungle' is deleterious to children's mental health, we do know that boring enclosures disturb the behaviour and damage the brains of captive animals (Miller 2002), a finding which incidentally may render much animal research inaccurate if not useless.

Becoming ‘used to’ a place is probably the primary case of categorical learning in animals, sufficient integrated knowledge of a place facilitating efficient life there. But it is also evident that the need for security is place-based. People ‘become attached’ to their home (Earhart 1992; Earhart and Weber 1996; Giuliani 1991; O'Bryant and Murray 1986), street (Fuhrer and Kaiser 1992), neighbourhood (Bonaiuto, Aiello et al. 1999; Hyde 1998; Ringel and Finkelstein 1991; Taylor 1996; Taylor, Gottfredson et al. 1984), work (Dubin 1995), workplace (Finch and Inalhan 2002), town (McAndrew 1998) and holiday home (Kaltenborn 1997b). Children ‘become attached’ to their school classroom (Turkel 1997). Divorce precipitates ‘clinging’ reactions to home in children (Stirtzinger and Cholvat 1991), and premature initiation of out-of-home daycare in infants disrupts attachment behaviour (Vaughn, Deane et al. 1985). Insecure parental attachment predicts greater lifetime homelessness (Franskoviak 1999), which could be a direct effect of poor place attachment or an indirect one mediated by relationship conflict.

Most place attachment studies have viewed places as exclusively social rather than physical. Neighbourhood attachment seems weaker than that to home or city, social attachment predominates over physical, and place attachment varies with age (Hidalgo and Hernandez 2001). Place attachment is predictable from home ownership and the extensiveness of social networks, and is significantly related to neighborhood satisfaction (Ringel and Finkelstein 1991). Those living in culs-de-sac are more strongly place attached than those on through streets (Brown and Werner 1985). We also develop multiple place attachments to places of recreation, learning and relaxation. Attachments to home are not necessarily the strongest of these and may even be painful. Adults feel a need for places where they can find and explore their personal and socio-political identity (Manzo 1995). But living in a place does not automatically lead to attachment to it (Rubinstein and Parmelee 1992). Rigorous research into attachment to place and home is at long last being undertaken (McBain 2000). Interestingly, the challenge in producing believable virtual worlds is now seen to extend beyond visual accuracy: what convinces us we are in a relationship are the emotional dynamics, or the ‘metrics of human relatedness’. Attachment theory is therefore being used to assess a ‘Virtual Mom,’ with clinical psychiatric testing to follow (Alessi and Huang 1998).

Finally, proponents of ‘psychogeography’ - a marriage of geography and depth psychology - maintain that conscious experience of the external world is rooted in unconscious fantasies and defenses such that geographic and manmade features come to embody male and female anatomy, incestuous desires, inner splits, separation conflicts, and family relations. It claims to be open to academic enquiry, encompassing historical and cultural geography, psychohistory, cultural anthropology, environmental and political

psychology, migration studies, cartography, international relations and psychoanalysis (Stein 1987; Stein and Niederland 1989). However a much older use of the term by the revolutionary anarcho-Marxist art movement the Situationist International defined psychogeography as: 'The study of the precise effects of geographical setting, consciously managed or not, acting directly on the mood and behaviour of the individual.' They intended a critique of what they saw as urban capitalism's reduction of life to mere production and consumption, and the resulting alienation (van Kranenburg 2002). A more recent formulation suggests that: 'Psycho-geography is the hidden landscape of atmospheres, histories, actions and characters which charge environments. The lost social ley-lines which make up the unconscious cultural contours of places.' Psychogeographic research is pursued through the dérive, an aimless drifting through the city while recording the emotions provoked by each place; and mental mapping, producing mood-based maps (Nottingham Psychogeographical Unit 2002). The aim of such methods is to alert the participants to invisible psychic compartmentalisations and our reactions to them (Debord 1955; van Kranenburg 2002). Environmental psychologists might legitimately claim that this is what they do too.

2.5.4.3.5 Attachment and place

Outside interpersonal attachment, by far the greatest volume of 'attachment' literature is on place, though much of it blurs the distinction between built and natural environments. Attachment to place – often in the literal sense of preferring to stay or return there - is common in the animal kingdom, for instance among fish (McNulty 1997), birds (Nolan and Ketterson 1991), sheep (BBC Radio Cumbria 2002) and deer (Fischer 2001). Prehistoric (Fullagar and Head 1994) and therefore potentially modern humans probably have it too. The concept of 'place attachment' is common currency in certain geographic circles, having been somewhat loosely borrowed from interpersonal attachment (Altman and Low 1992; Proshansky, Fabian et al. 1983). Increasingly heard are the related terms of having a 'sense' (Bott 2000) or 'feeling' (Hiss 1990) of place. Is has been said that attachment to landscape can be seen as a reflection of its evolutionarily determined status as a basic unit of human activity, or as a cultural artifact, or a source of abstract symbols (Riley 1992).

Psychological assessment of the emotional reaction of visitors to natural areas was envisaged decades ago (Jacob 1973) and has become a mainstay of environmental psychology. However, with partial roots in behaviourism, and others in geography and architecture, this field is unfortunately characterised by the absence of the non-human living as an intersubjective experience (Bell, Greene et al. 1996; Bonnes and Secchiaroli 1995).

Indeed in it's striving for 'scientific' rigour it may not merely have failed to acknowledge non-human subjectivity, it may have (perhaps unintentionally) denigrated it since:

> *'…it is not merely that experimental (and by implication environmental) psychology has failed to foster a realistic awareness of our place in the natural world, but rather that it has actively contributed to the construction and legitimation of a form of personhood that is inherently hostile to nature.' (Kidner 2001, 51).*

Nevertheless, we are now able reliably to measure 'sense of place' (Bott 2000; Williams and Vaske 2001). So too 'place attachment', which has an internal structure or dimensionality that resembles levels or hierarchies in attitudes (Kaltenborn 1997a). The latter is mentioned in four literatures: psychoanalytic (object relations) theory; environmental autobiography; behaviour mapping, and; favorite place analyses (Chawla 1992). Place attachment is said to be made up of: the interactional past, or memories of interactions associated with a site, and; interactional potential, or future experiences perceived as possible (Milligan 1998). Another characterisation suggests that it is distinct from territoriality and has two dimensions – 'rootedness' and 'involvement/acquaintanceship'. People differ in the intensity of their place attachment, but some places are more 'attachable' than others (Taylor, Gottfredson et al. 1985).

Ryan differentiated place-specific and conceptual attachment to urban natural areas. Neighbours and recreational users tended to be place-attached, and favoured management for aesthetics; conservationist volunteers, staff, and the particularly knowledgeable were conceptually attached and favoured management for native species. 'Wilder' areas were more appreciated by those engaged in restoration (Ryan 1997).

Those who are more highly place attached move around less for leisure (Fuhrer, Kaiser et al. 1993), whereas modern mobility is said to result in the 'kinetic personality': a rootless, dislocated, interpersonally promiscuous type increasingly immersed in a virtualized culture, who sees time as fragmentary, and process as more important than product. Imaginary living compensates for real location attachment, notoriety replaces expertise, and intellectualism is mistrusted. Youth orientation, expediency, and craftiness are emphasized (Rubin 1990). On the other hand, those who feel 'embedded' in their workplace or community may as a result behave differently: analogously, 'ecological embeddedness' implies personal identification with the land, and attitudes of reciprocity, and caretaking (Whiteman and Cooper 2000).

Many claim that direct experience of nature and 'special places' shapes childhood (Nixon 1997). Nabhan and Trimble (1994) argue, albeit in poetic prose, that children 'need' wild places; they are conspicuously prominent in adult recollections of childhood (Chawla 1994). Certainly, children living in greener environments have greater attentional capacity and can delay gratification and inhibit impulses better than those who live surrounded by concrete (Kuo 2001; Taylor, Kuo et al. 2002). Rural children are also more strongly place-attached than urban children (Nanistova and Mesarosova 2000).

In a developmental perspective, children's opportunities for spatial learning may to adults seem initially limited and confined to physically controlling and orienting the self but, with mobility and inquisitiveness, they soon mushroom. Their exploratory, or 'home', range develops progressively with experience, as per Matthews' diagrams (see Figure 2.7 and Figure 2.8). Children aged 4 to 5 have a home range of up to 140 feet from home, extensions of this range occurring first along paths to playgrounds. Children aged 6 to 9 range ten times further, and travel 5 to 8 times as much; for 10 to 12 year olds the number of destinations greatly increases (Coates and Bussard 1974). Over time they become actively aware of a larger area and more distant places, the greatest increase due to self-initiated mobility between the ages of 8 and 9 (Matthews 1992).

The more children know about a place the more they are aware of it (Matthews 1992, 122) and the greater their place attachment (Taylor, Gottfredson et al. 1984). Boys on average acquire a larger 'home range' of confident wandering, and do so earlier than girls. Regardless of other factors, children who roam furthest are most skilled at environmental recall and representation (Matthews 1992, 168). Children themselves prefer to play in green space or near home (Moore 1986), and middle school-age children are the heaviest users of the outdoor landscape (Chawla 1992). Children's discovery of place is a 'dialectic with the making of self' (Matthews 1992) which may to some extent hinge on exploratory behaviour (Keller 1998).

Perhaps adults also have an inherent need to explore. While place attachment depends on experience of a particular location and is linked to lower socioeconomic status, attachment to 'wilderness' is more generalised and linked to lifestyle (Williams, Patterson et al. 1992). However with increasing experience of a place, adult wilderness users wander progressively further from civilisation (McFarlane, Boxall et al. 1998). Those taking trips into wilderness areas often report feelings of spiritual inspiration (Fredrickson and Anderson 1999). Solitary 'vision quest'-type activities may increase feelings of self-worth (Angell 1994), including in abused women who attribute the effects to 'a renewed sense of connectedness with the Earth' (Powch 1994).

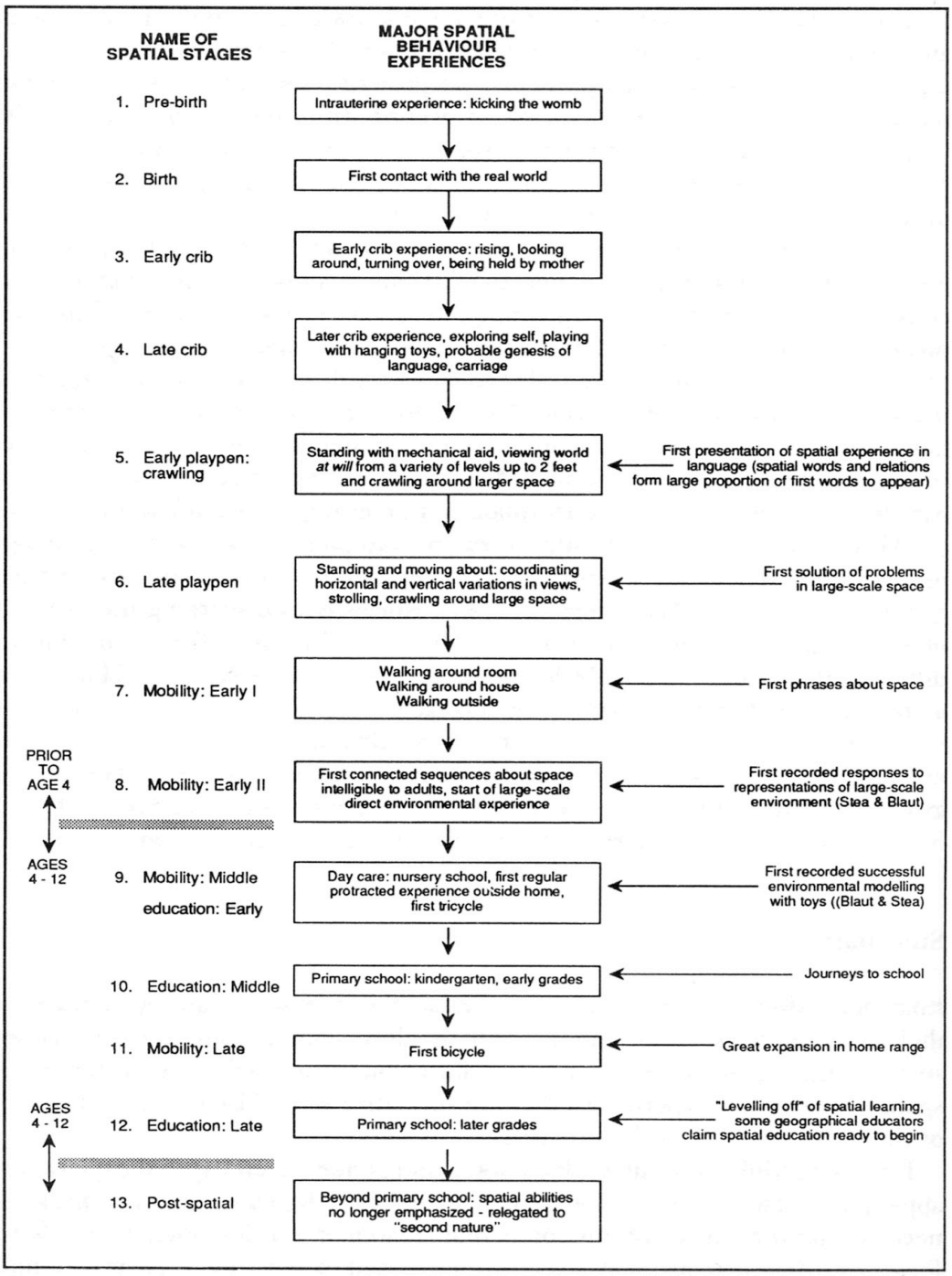


Figure 10.1 The experiential basis of children's cognitive mapping skills (Based on: Downs and Stea, 1977)

Source: Matthews (1992), p190.

Figure 2.7: Matthews' experiential basis of mapping

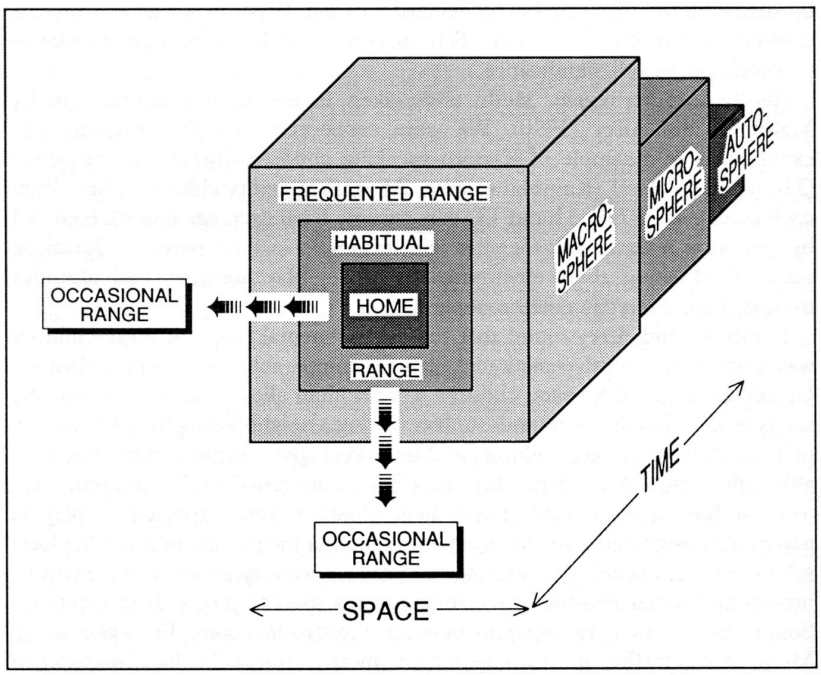


Figure 2.7 A model of children's territorial range development: a space–time framework

Source: Matthews (1992), p52.

Figure 2.8: Matthews' model of children's range development

Places can be meaningful to us mythologically and psychodynamically (Lestrange 1998) – imaginal and sometimes real 'journeying' is central to shamanistic therapies. People employ metaphors of their place as metaphors of their lives, including images of home and journey, and attachment to and detachment from place (Lestrange 1998). Landscapes are said to 'communicate' meanings (Devereux 1996; O'Donohue 2000; Tuan 1974). Aimless exploration in natural settings is psychologically beneficial, being associated with creativity (Claxton 1997), stress reduction (Ulrich 1993) and self-esteem (White and Heerwagen 1998). Solitude from other humans may be needed to arrive at accurate self-knowledge: lack of it may contribute to dependencies and disorders like sleeplessness, depression, addiction and abuse. Time spent alone and attachment are complementary, not mutually exclusive (Buchholz 1997). Interestingly, some psychotherapists are asking clients to see their bodies as a landscape (Mowthorpe and Dunn 1997) to aid their 'inner journeys'.

Psychoanalysis speaks of the need for psychic 'separation' of the child from the primary caregiver; but it may be that a necessary condition of successful separation is having previously successfully become attached to place: this has been shown in young dogs (Fox 1975). Stimulus-poor primates remain more attached to their mothers ('pathological hyper-attachment'), which led Bobbitt (1968, in Fox 1975) to propose that detachment from the

mother is a progressive process linked to attachment to the environment. Ironically, given the suggestion that poorly attached children may become over-attached to pets, for instance, it may be that secure interpersonal attachment is a necessary prerequisite of normal attachment to place: agoraphobia and anxious attachment are related (Ruiter 1992; Strodl and Noller 1999).

People who are displaced experience nostalgia, disorientation, and alienation which can undermine their mental health (Fullilove 1996). The strength of these effects is determined by, among other things, the strength of prior attachment (Brown and Perkins 1992; McAndrew 1998). Children whose parents move home often are more likely to become anxious or depressed (Ballenger 2000). Children whose parents divorce and yet stay in the same place tend to mourn, deny the reality of the divorce and intensify their need to control the environment. Those who move, however, spend time trying to adjust to the new place and establish new boundaries of behaviour (Stirtzinger and Cholvat 1991). It has been suggested that residential moves may be understood better as a process of separation and reunion with a type of settlement than a permanent breaking of bonds (Feldman 1996).

It is clear therefore that places and landscapes have significant psychological impacts on us. There was even speculation half a century ago that mountains have had an influence on the development of human intelligence (Young 1957). Perhaps this could be postulated for many aspects of our surroundings. It is not just that:

> *'We need natural landscapes and seascapes as psychological resources so that we can put ourselves at ease by returning home again to the environment that made us the natural organisms that we are.' (Partridge 1984)*

but that the mechanism for that 'returning' is now coming into focus: spontaneous, and preferably early, exploration.

2.5.4.3.6 Climate, community, 'The Planet' and 'God'

If one has by now accepted the argument that at least some of the important defining elements of attachment relationships are present in interactions with pets, plants and places, it is not a great stretch to understand how the argument for psychological meaningfulness may also be extended to other dynamic and inescapable features of the outdoors (Hill 1998a). Given the progression toward the ever-grander scale and less animate, the logical extension is now to ask if attachment might exist to the largest-scale and most intangible

phenomena that touch our lives, the climate, 'The Planet' (capitalised to echo the common environmentalist mantra to 'Save The Planet'), 'community' and 'God'.

The day-to-day weather of one's place, the temperature and its variability, the precipitation, the winds, the cycles of light and darkness, the seasons, all might conceivably be attachment-salient phenomena. Perhaps only in the effectively weatherless indoors (where in western industrial culture we now spend the vast majority of our time) might we even contemplate otherwise. For example 'cabin fever' or Seasonal Affective Disorder (SAD), more common at extremes of latitude, is discussed seriously, but there may for instance be some grain of truth to the colloquial impression that societies nearer the equator tend to be more easy-going because of the predictability of light and warmth; that (relatively rainy, at least on oceanic seaboards) western coasts tend to harbour more unselfconscious cultures in contrast to more proper east coast cities; or that peoples who 'enjoy' relentless cold winds have an air of teeth gritted against the gales about them… It is not difficult to imagine how portents of good weather or seasonal turning like a 'red sky at night', the coming of the rains in a dry place, or the first cuckoo of spring might change people's mood. Certainly the moon has effects (Dobson 2000). On another level, though 'The Planet' is a fairly recent idea in human consciousness, and cannot therefore have had evolutionary psychological consequences, environmentalists repeatedly claim it is desirable to feel 'love' for it (Caldicott 1992). Nevertheless the initial impact at least of the first image of the earth from space is undeniable. Unfortunately there is no research known to this author that addresses these phenomena in an attachment framework: these are therefore another opening for further research.

However the idea of community, or at least of the 'tribe', is primal: the oddity is that some humans seem to see it as optional. Primates are inherently social, vitally concerned with each other's minds (Mithen 1996). Belonging to a troop provides protection, a repository for 'culture' and opportunity for maturation of interpersonal relationships. 'Grooming' maintains hierarchy and calm; as grooming time rises among primates, so does cranial capacity. But our brain size is such that we would spend an unmanageable proportion of our time grooming; since we do not, the conclusion is that language evolved as 'virtual grooming', to fill the gap by efficiently extending our knowledge of others without direct contact. From correlations with primate troop size and numerous other indices including both archaeological and modern data, human group size is reliably computed to be about 150 (Dunbar 1996) – not the size of settlements we live in, but the size of community we can personally know and (mentally) inhabit.

Loss of community impacts directly on individual health (Mackenzie 1994) and modern industrial society with its individualism and hypermobility mitigates against it more than

most, contributing to a widespread malaise including depression and unfilled attachment needs (James 1998). Although loneliness is more than merely being alone (i.e. is a subjective experience) (Rook 1984), social bonding is a proven buffer against stresses (Fleming and Baum 1986; Rook 1987), releasing endogenous opioids and causing relaxation (Nelson and Panksepp 1998). Individuals who experience insufficient or inadequate social support have higher levels of stress hormones, reduced resistance to disease, susceptibility to heart attacks, and poorer mental state (e.g. optimism).

An individual's attitudes to and degree of participation in their community predict their psychological attachment to it (Zhao 1996). Interestingly, security of attachment uniquely predicts perceived social support: and children who feel they have social support are more likely to see ambiguous actions as prosocial rather than aggressive (McLeister and Barnett 1999). Although concordant for most people, sense of community and attachment to place are different. Those most likely to experience a sense of community are more likely to be female, more socially linked and perceiving of less disorder, whereas attachment to place is felt most strongly by less educated, long-term residents of stable, wealthy neighborhoods. Since personality factors are far more important than surroundings (which accounts for just 10% of variance in these sentiments), planners seeking to improve neighbourhoods should pay more attention to the people than the place (Hyde 1998). A particular perspective on rebuilding community is integral to the Third Way political philosophy of the UK's Blair government (Etzioni 1995; James 1998, 139).

'Attachments' are also said to form with a variety of other phenomena including social networks, strata and organisations, localities, nations, linguistic, national and racial groups. Even intangible concepts such as ideas, ideologies and subcultures can be considered, perhaps analogous to the security people may feel in pursuing a lifestyle such as nomadism or shifting cultivation, or historical expansionism (Crosby 1997).

As for God, the theologian Martin Buber believed there are two relational stances we adopt toward other beings (including specific mention of the non-sentient such as trees): I-it and I-thou. Experiences of separation flow from the former; the latter is intimate identification and, he claimed, 'All real living is meeting.' (Buber 1958/1933, 25). Analogously, philosopher John Macmurray saw the function of religion as a constant reminder of what the ideal 'other' would be like, from which flows improved behaviour to real others (Macmurray 1991). Indeed there is now evidence confirming that religion is used to make up for the lack of an ideal other (Granqvist and Hagekull 2000) or as a substitute attachment figure (Kirkpatrick 1998).

2.5.4.4 Non-attachment

In Buddhism and Hinduism, the concept of 'non-attachment' describes a lack of need for worldly comforts or a valuation of all things as equal, and is seen as a vanishingly high aspiration which few reach (Bakker 2001). At first thought this may seem to be a distinct, purely spiritual, understanding unrelated to Attachment Theory. But non-attachment, it has been claimed, may lie in the balance between attachment and detachment (Zimberoff and Hartman 2002). Naïve attempts to practice saintly non-attachment may be damaging if done out of context (Kornfield 1993). This may be because such descriptions do in fact have unacknowledged roots in Attachment Theory: 'non-attachment' may be a state, not of never having developed secure attachments but, rather, of having developed and then transcended them. In other words, genuine (religious) non-attachment may come about as a result of knowing that the security of people, things and places is always there to return to if needs be.

2.6 Holistic theories: 'Ever-widening spheres of meaning and participation'

The so-called 'Romantic' model of development (Figure 2.9) has been characterised as a journey from absolute one-ness or identification with the world through an apogee of severance from it and back again at maturity to a complete reconciliation (Chawla 1994, 46). This has obvious commonalities with various humanistic psychologies, which hold the possibility of self-actualisation as an article of faith (a state that Maslow claimed only about 10% of people ever truly achieved), and with psychoanalytic ideas of separation.

Within this framework we might note that integration with and separation of self from world necessarily includes bonding with and then separating from others, a notion central to the 'object relations' school (Greenberg and Mitchell 1983; Mahler, Pine et al. 1975; Winnicott 1976). A similar conception comes from Erikson, who says that 'the human personality in principle develops according to steps predetermined in the growing person's readiness to be driven toward, to be aware of, and to interact with, a widening social radius' (Erikson 1963, p. 270), a sentiment shared with the related field of attachment theory (Ainsworth, Blehar et al. 1978; Bowlby 1988; Sperling and Berman 1994).

The 'ecopsychological manoeuvre', as one recent author expresses it (Fisher 2002) is 'simply to assert that this process wishes to continue beyond the human realm, that our humanity is incomplete until we have established our kinship or social relations with the

larger natural world and so satisfied our longing to feel at home in or at peace with the cosmos as a whole.'

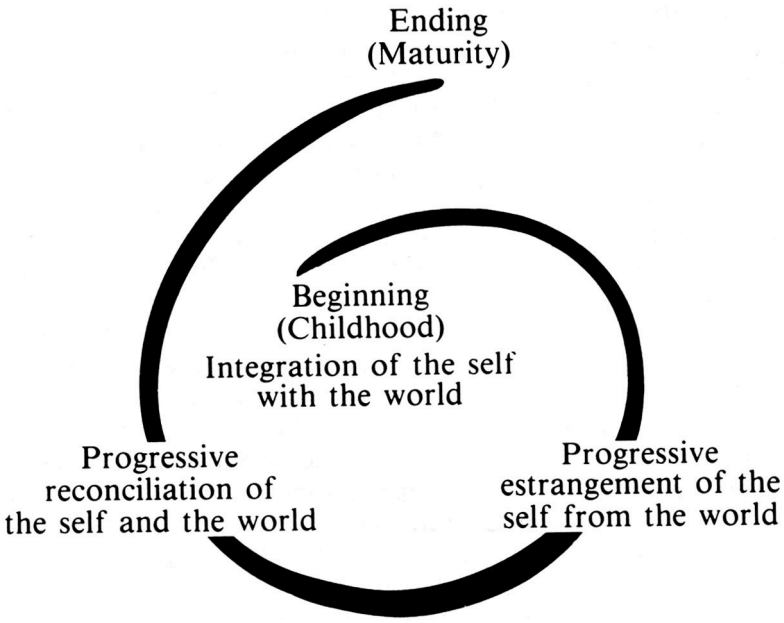


Figure 1. The Romantic Model of Development

Source: Chawla (1994), p46.

Figure 2.9: Romantic model of personal development

Given all of the above perhaps, to pursue the idea, it is a modest leap to contemplate that attachment theory might usefully be broadened to encompass and describe an aspect of the human-nature relationship. It may be that attachment to nature is no analogy, but a reality. Perhaps we seek to maintain proximity to nature although, as in human relationships, in its absence that closeness can be maintained to some extent with the help of an internal representation of nature established or developed in early interactions. When deprived of it we may, as in interhuman attachment, seek intermittently to re-establish proximity and interaction, with pleasure or joy upon reunion. Long separations from nature may cause subconscious or even conscious distress: and some maintain that permanent loss of all or part causes grief (Seed, Macy et al. 1988).

Shepard argues that psychological maturity 'celebrates a central analogy of self and world in ever-widening spheres of meaning and participation, not an ever-growing domination over nature, escape into abstraction, or existentialist funk.' (Shepard 1982, p14) The claim is that we are innately motivated simultaneously to differentiate ourselves from others and to expand our awareness to broader and deeper conceptions of what 'other' might be. He

conceives of the process as an oscillation or spiraling between symbiosis with a world that includes the non-human, and autonomy (see Figure 2.10).

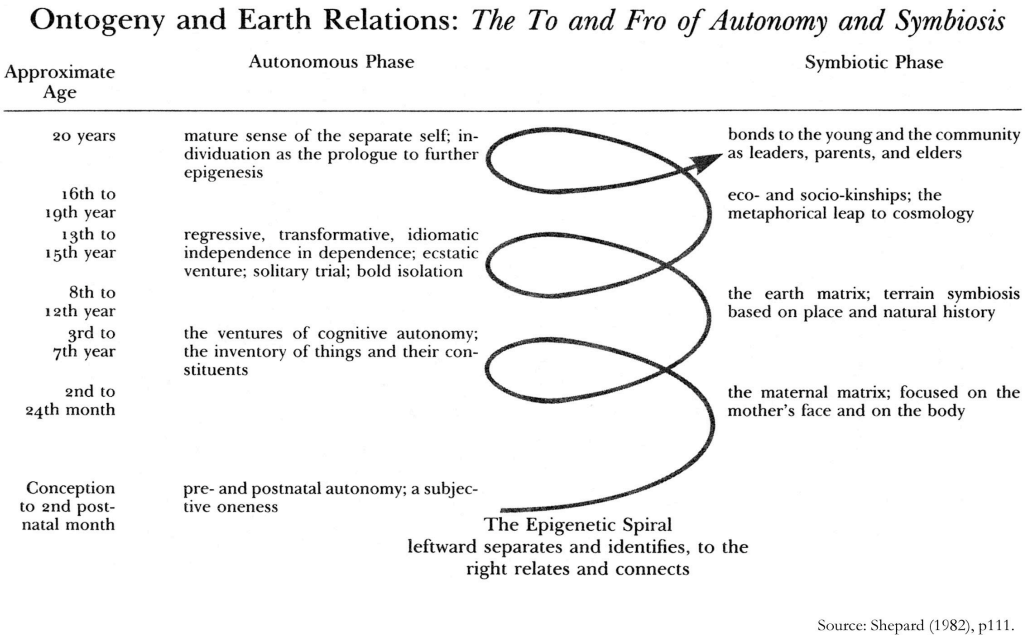


Figure 2.10: Ontogeny and earth relations

Perhaps this sort of 'dependent co-arising' conception is what led Naess to state:

> *'Traditionally, the 'maturity of the self' has been considered to develop through three stages: from ego to social self (comprising of ego), and from social self to metaphysical self (comprising social self). But in this conception of maturity of the self, Nature is largely left out... Therefore, I tentatively introduce, perhaps for the very first time, the concept of the 'ecological self'. We may said to be in, and of, Nature from the very beginning of ourselves.' (in Sessions 1995)*

The notion that qualities of the non-human world lastingly affect us may not be at all new; that the very structure of our personalities (and perhaps flowing from that our cultures) are deeply intertwined with our experience of nature is perhaps more novel to some. As we have seen, psychology has only begun to examine this proposition. However the impetus provided by the environmental movement has in the last generation brought about noteworthy investigations into what we think about and why we behave in the ways we do with regard to nature, and to this we now turn.

Chapter 3: Literature review: Attitudes and behaviours toward nature

'There was a child went forth every day,

And the first object he looked upon,

That object he became…'

Walt Whitman (1976/1855)

3.1 Experience, attitudes and behaviour in general

Debates about the 'self' revolve, as has been seen, to a significant extent around how experience of the environment in its broadest sense (i.e. our human, built and natural surroundings) impacts on 'who we are'. But 'who we are' may itself be an impossible notion ever fully to capture, since it inevitably and perhaps definingly includes some knowledge of the always-elusive interior life. Nevertheless, some aspects of the self cannot escape more exact characterization. It is when the individual acts in the world – moves, behaves, speaks, reacts – that the self becomes translated into deeds. When seemingly consistent patterns begin to emerge in these deeds, we start to believe we have a sense of who someone is.

Inevitably, the ways in which these patterns of external actions (which we call behaviours) and the internal cognitive and emotional patterns from they are reasoned to flow (which we call attitudes) are related has stimulated considerable theorizing and experimentation. This chapter therefore briefly examines where these speculations have brought us to, and how in particular the self acquires and expresses its attitudes and behaviours in relation to nature.

3.1.1 What are attitudes and how do they arise?

Attitudes are beliefs and feelings about an object that predispose one to behave in a consistent manner toward the object (Fishbein and Ajzen 1975; Weigel 1983). Fishbein and Ajzen (1975, 6) define attitude as 'a learned predisposition to respond in a consistently

favorable (sic) or unfavorable manner with respect to a given object'. They break their definition into three components: attitude is learned; it predisposes action; and such action or behaviour is generally consistent. Attitude is evaluative in nature - toward, for instance, pollution or wildlife - and such evaluations are based on beliefs. Hence environmental attitude can be defined as a learned predisposition to respond consistently favourably or unfavourably with respect to the environment. Numerous scales have been constructed to assess this attitude and its components – for example attitudes to wildlife, pollution or ecosystems. And there are problems with the claim that all aspects of attitudes are outcomes of learning and never innate (see discussion on biophilia in previous chapter). But first we will examine how attitudes are believed to come about.

Thurstone's early definition held that attitudes are simply positive or negative affect towards an object, a conception others echo:

> *'Attitudes are likes and dislikes. They are our affinities for and our aversions to situations, objects, persons, groups, or any other identifiable aspects of our environment, including abstract ideas and social policies' (Bem 1970, 14)*

More recently authors have suggested there are two components to attitudes (for example mental readiness to act, plus guidance of evaluations) and latterly three components (of cognition, affect and behaviour – a trichotomy which may have its roots in the three evolutionary layers of the brain: cerebral cortex, limbic system and old brain), which has been shown to account for greater covariation among measures. In an attempt to standardise terminology, Breckler and Wiggins used the terms *affect* and *evaluation* for, respectively, the emotional and cognitive dimensions of attitudes, usage that will be employed later in this work (Hogg and Vaughan 1998).

Bem contends that every attitude ultimately rests on a basic belief in either the credibility of one's own sensory experience, or upon the credibility of some external authority (1970). Thus, the possibility arises of two types of experiential learning: direct, and vicarious (also termed culturally mediated or social). Behaviourist descriptions of how this learning occurs speak of classical and instrumental conditioning, and observational learning from wholly external sources. In either case, first hand experience is supplemented by learning from other people (the most important being parents) and the media. Social psychologists tend to prefer the language of cognitive development, which places greater emphasis on the progressive building of a network of connections between ideas. Attitudes are held for reasons of foreknowledge (to avoid having to make judgments afresh each time an object is encountered), utilitarianism (recall of positive or negative outcomes), social identity

(expression of one's core values), and self-esteem (aligning oneself with success and denigrating things the holder finds threatening) (Bohner 2001).

Attitudes, therefore, can be said to summarise multifactorial dispositions that are assumed to arise from a combination of direct and social experience.

3.1.2 Do attitudes predict behaviour?

Probably the most powerful initial spur to the study of attitudes was the common-sense belief that they in some way 'cause' behaviour. Investigation has shown however that whilst there is often a relationship, it is not straightforward. Ajzen and Fishbein (1977) suggested that in order to find a close relation, both attitude and behaviour must be in respect of the same action, target, context and time frame. The reliability of predicted relationships increases with repetition of the behaviour and with 'conceptual correspondence', where subjects are primed to value particular aspects of attitude (Bohner 2001).

A good deal of research has investigated public attitudes and the attitude-behaviour relationship. Much of it assumes attitudes predispose individuals to behave in a certain way (Ajzen and Fishbein 1977; Liska 1975; Rokeach and Kliejunas 1972; Sample and Warland 1973). Whether attitudes predict *specific* behaviours has, however, been controversial.

One of the earliest and most widely cited empirical studies was undertaken before the Second World War on the subject of racism. LaPiere demonstrated a weak relationship between attitudes and behaviour, but has since been methodologically and conceptually critiqued. Many now suggest that contextual factors can have a significant influence on the relationship (Ajzen and Fishbein 1977; Liska 1975; Sherman and Fazio 1983). It has been pointed out that the attitudes assessed must relate meaningfully to the behaviour (Weigel and Newman 1976), that the wording of the questions asked of subjects can be critical (Schuman and Karlton 1985), and that multiple-item indicators of attitudes are more robust than single-item indicators (Sample and Warland 1973).

If the attitudes being assessed are abstract, they may be less easily measured and predictions derived from them may therefore be less accurate (Fazio and Williams, 1986). If the behaviours being assessed are not commonplace, there may be less of a predictable relationship with attitudes (Liska 1974). According to the Specificity Hypothesis (Fishbein and Ajzen 1975), general attitudes can only explain general behaviours. Greater consistency and predictive power can be obtained when measuring specific behaviours and well-defined attitude indicators. Put another way, the predictive power of attitudes on behaviour cannot be separated from the method used to assess them.

For example, the substantial attitude-behaviour research on recycling in the main suggests that attitudes are not good predictors of this environmentally sound behaviour (Buttel, 1987; De Young, 1986). Nor are income or education (De Young and Kaplan, 1985; Vining and Ebero, 1990). The best predictors turn out to be practical factors such as accessibility and ease of use (Derksen and Gartrell, 1993; Folz, 1991; Jacobs et al., 1984; Katzev et al., 1993): people living close to recycling facilities or with regular recycling collections are, not surprisingly, more diligent recyclers.

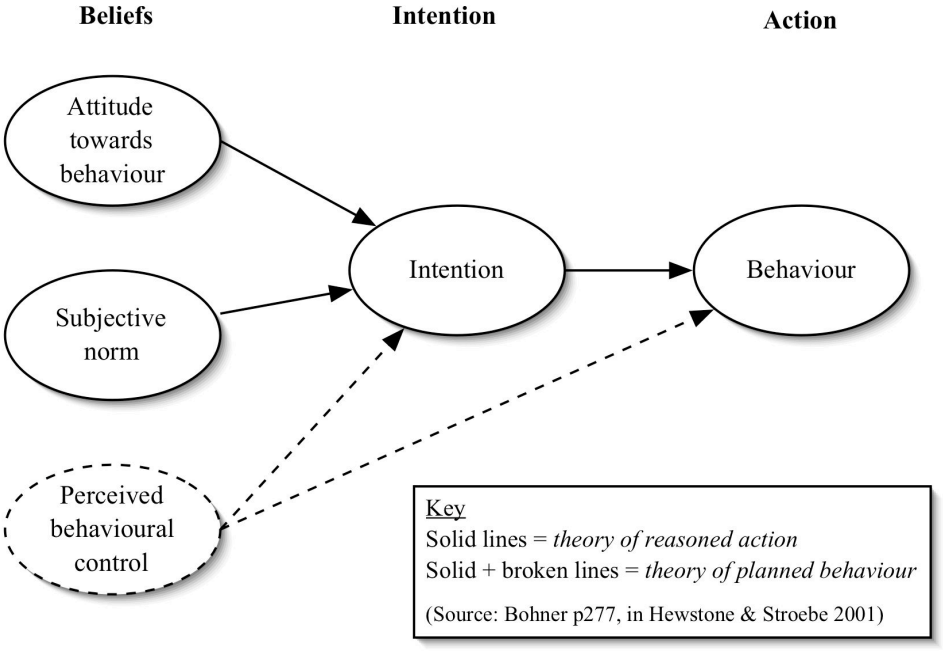


Figure 3.1: Theories of reasoned action and planned behaviour

A series of progressively more sophisticated theoretical approaches have attempted to capture the various factors that seem to be involved, with increasing success. The single most important attitude-behaviour theory has been that of Fishbein and Ajzen (1975). Their *theory of reasoned action* (see Figure 3.1) recognised that attitudes rest on a variety of predictor variables: firstly, *attitude towards the behaviour* concerned arises as a consequence of the subject's expectancy that a particular act will give rise to a particular outcome, modulated by the value they attach to this outcome; secondly, the *subjective norm* arises from the belief the subject has that a significant other person thinks they should do something, modulated by their motivation to comply with this person. These two components come together to form a behavioural intention, which leads to behaviour. This theory has been successfully applied to predicting numerous behaviours.

The model was later extended (Ajzen 1991) to incorporate a further predictor variable, *perceived behavioural control*, which was defined as the extent to which a subject believes it is easy or hard for them to perform the act in question. Thus renamed the *theory of planned behaviour*, this modification improved accuracy in complex and challenging situations where people have differing degrees of control over the outcome, and is the currently most popular theory.

3.1.3 Can experience predict behaviour, regardless of attitudes?

The conventional, rationalist view is that learning takes place as a consequence of experience (with is broadly conceived of as the taking in of new information), leading to the formation of attitudes, which then precipitate behaviour. It might therefore at first seem perplexing if behaviour could relate to experience in a manner that was not mediated by concordant attitudes. But this is to forget that behaviour, cognition and attitudes are themselves experienced, and that learning can therefore occur from each, effectively short-circuiting this linear model. It is also perhaps to suggest that conventional assumptions about attitudes, or at least definitions of attitudes, place too much emphasis on the rational processing of information: not every act is consciously controlled. Behaviours can be automatic, and some automatic behaviours may not accord with expressed views. Though not the subject of this thesis, it may be that a redefinition of attitudes to incorporate subconscious and even bodily learning would begin to answer this criticism.

Patterns of previous behaviour can influence future behaviour, without necessarily being mediated by attitudes. Two mechanisms are recognised: repetitive past behaviour (or *habit*) can become automatic if it occurs in a stable context, directly affecting future behaviour, or; past behaviour that happens in unstable contexts is less well learned and remains under conscious control, but can influence future behaviour indirectly via intentions (Bohner 2001; Prislin and Ouellette 1996).

Further, the attitude-behaviour relationship can itself be reversed and, in certain situations, behaviour can lead to changed attitudes. The theory of cognitive dissonance postulates that if there is a difference between the attitudes a person holds and their actions, discomfort known as cognitive inconsistency is experienced. Cognitive consistency theorists reason that humans possess a drive to achieve cognitive consistency, and that inconsistency acts as an irritant or stimulus. People experiencing this discomfort seek to reduce the inconsistency by changing their attitudes: justifying what they have done in retrospect, under the logic that ‘if I am doing something for no apparent reason, it must be because I like it’.

The perception of who brought about the change is critical. If a person believes they were compelled to alter their behaviour (e.g. restrictions on smoking), they can come to change their attitudes in the reverse direction, evaluating the forbidden act more favourably; however, if they feel they made the choice freely, attitudes tend to change in favour of the new behaviour, the better to justify it. Bem proposed that people can sometimes infer their own attitude from external cues: for example, being bribed allows an experimental participant to believe they only did a particular act for that reason, and not because they believed it to be right (Bohner 2001).

3.2 Attitudes and behaviours toward nature

3.2.1 Conceptions and models

Attitudes to nature are a special case of attitudes in general. Whilst there may be innate elements of our attitudes to the non-human – the subject of the biophilia theory – is it clear that much is learned. Tanner (1980), for example, clearly does not subscribe to a strong biophilic view: 'Children must first learn to love the natural world before they can become profoundly concerned with maintaining its integrity.' Partridge points up the danger of generalisations in this area, highlighting the influences of both history and culture on attitudes to nature.

> *'If we do, in fact, have a genetically coded need for nature, then our encounters with nature should evoke feelings of unity, harmony, and affirmation. That it sometimes does, and profoundly so, is abundantly clear in the historical records of religion, art, and literature... (There is, however, a contrary trend) ... The early colonists in North America regarded the wilderness as dreadful, alien, satanic. Even today, those who live in such remote regions as Tanzania and southern Utah, are bewildered by the trouble and expense that Europeans and southern Californians will tolerate just to be in the presence of their 'useless' wilderness.' (Partridge 1984)*

These differences over time and between societies are important in accounting for differing individual and collective behaviours toward nature, since: 'What we do about

ecology depends upon our ideas of the man-nature relationship' (White Jr. 1967, 1206). The so-called idealists, such as Schumacher (1974), believe that current ideas and values substantially determine environmental actions and policy, and hence conclude that 'the remedy for our environmental predicament lies in a change of values - in what *ideas* we hold as true and valid and worth defending' (Pepper, Perkins et al. 1984). This wholly rationalist view has more recently come to be seen as perhaps somewhat naïve if, as Pepper et al suggest, we tend to make up our minds about such matters, often on an 'irrational' basis, then look for evidence to support these beliefs. Little change in attitude may result from bombarding people with facts they are predisposed to dismiss. In recent years many have begun to suggest that an ecologically sustainable society would necessarily be based on ideologies and values that are long-standing, cross-cultural, in some sense 'natural' or 'primal', but currently not widely held.

By the early 1970s social scientists began to hone in on environmental attitudes and their consequences, leading to the creation of the New Environmental Paradigm (NEP) and a number of other research instruments (Dunlap and Van Liere 1978; Maloney, Ward et al. 1975; Stern, Dietz et al. 1993; Weigel and Weigel 1978). However there is uncertainty about whether these scales are comparable (Stern and Oskamp 1987) as they may not be tapping into the same core construct (Van Liere and Dunlap 1981), although they may share significant variance (Stern, P. C. 1992).

The earliest was the Ecology Scale, developed by Maloney and Ward (1973) to measure attitudes as well as knowledge, emotions, and behaviour. To no-one's surprise, respondents generally scored higher on verbal commitment and affect, and lower on actual commitment and knowledge. A version for children, the Children's Environmental Attitude and Knowledge Scale (Leeming, Dwyer et al. 1995), was also produced, with different items but a similar scale structure (Pelstring 1997).

By contrast, Weigel and Weigel's (1978) Environmental Concern Scale and the Awareness of Consequences (AC) scale, produced to help predict environmental behaviour, included belief *and* evaluative dimensions. Similar to the NEP in that it sought to examine general attitudes toward environmental issues, it included such items as 'the currently active anti-pollution organizations are really more interested in disrupting society that they are in fighting pollution', and 'the federal government will have to introduce harsh measures to halt pollution since few people will regulate themselves.'

These three widely used scales for environmental attitudes (NEP, ECS, AC) predict between 19% and 23% of the variance of (self-reported) environmental behaviours, but with

decreasing strength with rising income, lesser education and more right wing politics (Tarrant and Cordell 1997).

O'Riordan (1977) proposed the basis of what has become the most enduring classification of environmental attitudes, defining the extremes of a possible one dimensional spectrum of attitudes as 'technocentrism' and 'ecocentrism'. Technocentrism was said to be rooted in scientific rationalism, assumed experts knew best and politics merely confused matters, and held an optimistic view about our ability successfully to manipulate nature to our own ends. Ecocentrism on the other hand assumed that humans are inextricably situated within a delicate and 'seamless web of life' of which we are an integral - but not essential - part, bound by the laws of nature, which are outside our control. An ecocentrist would argue for the preservation of wilderness for its own sake (or 'intrinsic value'), rather than its significance to us (or 'instrumental value'), although its value to us goes beyond sustaining human life to encompass psychological and even spiritual functions. While the ecological point of view focuses on the 'all-ness' of nature, anthropocentric perspectives particularise, or focus more on the 'eachness' of things. The ecocentrist believes that a view of the whole increases knowledge of the parts (Partridge 1984).

(The criticism sometimes heard that ecocentrism is inherently nonsensical, since humans cannot view the environment from other than a human perspective, is founded on a misreading of what the characterisation is intended to capture, which is not where we stand but where we direct our empathy. Similarly, the stance that since humankind is part of nature, all human actions are 'natural' is a piece of semantic sophistry, collapsing the distinction between humans and nature without addressing the case that causes it to be made (Oelschlaeger 1991, 1992; Passmore 1980). We will accept Oelschlaeger's definition of ecocentrism as 'a human but non-anthropocentric perspective on nature'.)

Contemporaneously, Dunlap and Van Liere's (1978) New Environmental Paradigm held that a world-view was emerging that differed dramatically from what was termed the Dominant Social Paradigm (DSP). The DSP included faith in science, 'progress', and a laissez-faire economy (with obvious echoes of technocentrism). Subscribers to the NEP believed in limits to growth, a steady-state economy, and preservation of natural resources (clearly related to ecocentrism). The original 12-item scale sought to assess where subjects stood on the DSP-NEP scale, according to their level of agreement with belief statements such as: 'We are approaching the limit of the number of people the earth can support'; 'The balance of nature is very delicate and easily upset', and; 'Humans need not adapt to the natural environment because they can remake it to suit their needs.

Later authors (Oelschlaeger 1991, 1992; Thompson and Barton 1994) nuanced O'Riordan's two-extremes view, interposing less extreme categories of anthropocentrism and conservationism. Anthropocentrism is the view that human needs are supreme and the final arbiter of action, but is seen as less conceited over the power of technology. 'Nature *matters*, has *value*, has *significance*, only if there is a species *to whom* it can have significance. It follows that values in nature are almost exclusively *human* values'. (Partridge 1984) Conservationism, or 'anthropocentric nature-love', shares an holistic view of nature with ecocentrists: the whole is greater than the sum of the parts. All elements of an ecosystem are critical to its healthy functioning, and maintaining this with for example wilderness will bring benefit to future generations. But nature is valued first in terms of human utility, including non-material values such as aesthetics and morality.

From the ecocentric point of view, conservationism remains anthropocentric, since human interests are the ultimate arbiters of value. Ecocentrism goes beyond conservationism by questioning the idea that humans are superior to nature, with subsequent imposition of human values on nature.

Most research on environmental values implicitly assumes that underlying attitudes predispose people to particular actions. Research to test the relationship between environmental attitudes and 'responsible environmental actions' has been sparse (Stern, Young et al. 1992, 89-91), focuses heavily on home recycling (De Young and Kaplan 1985; Vining and Ebero 1990) and all too rarely covers environmentally-relevant behaviours like lifestyle choice (e.g., public transport use, buying recycled products), or environmental activism.

A more sophisticated, two-dimensional understanding of individual perception of the environment was suggested by Douglas (1996). People are said to differ along two axes – of social and interpersonal relations, and of desirable restrictions on behaviour. Within any given culture, people choose their 'thought style' in order to sustain their preferred patterns of social relations. Those who prefer strong group boundaries and binding behavioural prescriptions are termed hierarchical; strong boundaries and minimal prescriptions, egalitarian; minimal boundaries and minimal prescriptions, individualistic, and; minimal boundaries and binding prescriptions, fatalistic (Douglas 1996).

Thompson et al extended Douglas' quadripartite attitudinal stance notion with the suggestion by ecologists that people tend to propose different solutions to ecological problems based on their own concepts of the ecosystem to produce a four-fold classification of 'myths of nature' (Schwartz and Thompson 1990; Thompson, Ellis et al. 1990). People characterise nature as benign, ephemeral, perverse/tolerant, or capricious. Since each of

these models is founded on personal assumptions that are in general unexamined by the individual, each appears self-evidently rational and workable in practice to its holder. Each corresponds with one of Douglas' thought styles. Keller describes these 'myths' as follows:

> *'Nature is ephemeral.' The egalitarian thinker holds that resources are scarce and uncontrollable, and nature exists in delicate balance. Risk averse, they believe that reducing their personal consumption will help solve environmental problems. The preferred policy aims at equity for present and future generations to be achieved by radical changes in society and one's own behaviour.*
>
> *'Nature is tolerant.' The hierarchical thinker sees nature as a robust but unstable system whose limits are known only to experts. Resources are scarce, but controllable. Armed with expert advice, Governments can control the environment through regulation and, as such, we should make use of what it offers within its known limits.*
>
> *'Nature is benign.' The individualist conceives nature to be a robust system, with abundant and controllable resources. A believer in equal opportunity, free market economics and economic growth, s/he believes that technological solutions will inevitably arise to overcome environmental problems. This, many would argue, represents the dominant beliefs of western industrial society.*
>
> *'Nature is capricious.' The fatalist perceives nature to be unmanageable and unpredictable, and both resources and needs are uncontrollable. Since things happen by chance, they see little reason to act and are unconcerned about environmental problems (Keller, R. and Poferl 1998).*

It is notable that amid the work on environmental attitudes, 'environment' seems to signify many things to many people. On some occasions it is as broad as 'the planet' or 'ecosystems', on others it is associated with the political issues that have come to be labeled 'environmentalist'. Place-based surveys may refer to both local and national issues, ignoring the fact that proximity and degree of personal involvement are known to have significant effects on people's attitudes (e.g. Jorgensen and Stedman 2001; Kellert 1993; Stedman 2002; Vaske and Kobrin 2001). There is a pervading sense of what has been called 'thingification' (Césaire 2000; Lefort 1996) of 'the environment' and a comparative avoidance of the motivational roots of the sometimes-close personal relationships which, for most of us, constellate the bulk of our contact with particular aspects of the non-human.

Most curious of all, however, is the treatment of animals in general, and specifically what might - to coin a phrase - be termed ‘intimate nature’: gardens, house plants, tame and semi-wild domestic animals including companion cats and dogs, fish in tanks, garden birds, house mice, welcome and unwelcome insects. There is research of varying perspective and authority on each of these, for example attitudes to animals (Hills 1993), hunting (Yun Hwan and Seong Il 1995), woodlot ownership (Erickson, Ryan et al. 2002) and on the theme of house plants in offices and homes – sponsored by florists (Horticultural Trades Association circa 1990), but in years of digging this author has failed to unearth quantitative research which satisfactorily addresses the whole panoply of relations with non-human nature in an integrated fashion. This is undoubtedly for lack of a unifying theory. It could also in part be because there is unclarity between the terms ‘environment’ and ‘nature’ - the usually unstated assumption presumably being that what is examined is attitudes to non-sentient nature (arbitrarily dividing animals into two artificially human-defined categories), or that to which we do not relate personally (but why exclude pets as examples of ‘nature’?).

What proof is there that particular environmental attitudes lead to particular environmental behaviours? In fact, the correlations are modest (Buttel 1987; Dunlap and Scarce 1991; Gigliotti 1992; Van Liere and Dunlap 1980). In fact, whether espoused environmental attitudes are carried through into behaviour rests not on expressed good intentions but on underlying beliefs. Thompson and Barton (1994) demonstrated that of those who endorse pro-environmental attitudes, people that hold anthropocentric values are significantly less likely to practice conserving behaviours, are more apathetic toward environmental issues and join less environmental organizations than those who hold ecocentric values. In other words, whatever people say they believe, active environmentalism can be recognised not from expressed pro-environmental attitudes, but from ecocentric values.

3.2.2 Demographics and personality

The placing of environmental attitudes in the context of attitudes we hold toward other objects, and the significance of gender, personality and cultural perspectives (all significant influences in childhood) was perhaps underemphasised in early work.

We might ask, for example, how much we value nature in relation to other causes demanding our sympathy. This is of importance not least because expert and lay judgments of the ecological importance of particular ecosystems differ (Edwards-Jones 1994). One of the few social science methodologies pursued in this field is not psychological, but

economic. Building on a standard 'price = value' assumption, environmental economists ask people how much they would pay to save the last elephant or accept to allow a particular type of pollution. This 'contingent valuation' method can lead to perverse results since, clearly, the price people allocate is likely to depend on their wealth, their own and their culture's attitudes to nature. The 'rational economic man' model of behaviour employed is psychology primitive: values can be arrived at for reasons outside this model (for example altruism), and economists need to take more account of attitudes (Spash 2000). Fortunately there have been some more even-handed attempts by psychologists enquiring about attitudes to nature to assess relative values (Paul 1992).

Sex is a significant arbiter of attitudes. Women show consistently higher levels of environmental concern while men have greater knowledge of facts (Gifford, Hay & Boros, 1982/83; Arcury, Scollay & Johnson, 1987). Women are stronger supporters of environmental protection and more willing to act on it (Stern and Dietz 1994). This may be rooted in differing male and female socialisation experiences: it has been argued that women are taught to characterize moral dilemmas in terms of interpersonal relationships, which may therefore be resolved through an ethic of care. Men's understanding, on the other hand, is said to be more impersonal and they are more likely to resort to abstract concepts of 'justice' (Gilligan 1993).

This difference, it is suggested, leads women to endorse and operate from a more protective, biocentric position (Mohai 1992; Steger and Witt 1989). Sex differentiation in environmental concern and therefore behaviour may reflect pre-existing divisions of labour (South and Spitze 1994). Although higher environmental consciousness is associated with parental education, particularly among boys, girls exhibit greater environmental responsibility than boys. Wilderness experience also contributes to greater concern, although it is less significant than gender and socioeconomic factors (Hampel, Boldero et al. 1996). Attitudes to animals are significantly related to gender (Mathews and Herzog Jr. 1997).

There are other salient demographic factors: US participation in environmental politics and environmental organizations is consistently greater among those with more money, education and prestigious careers (Pierce, Steger et al. 1992; Verba and Nie 1972). Environmental knowledge and actions differ between rural and urban residents (Arcury and Christianson 1993) and between subcultures (Bragg 1995, 1996). There are (or at least were in the US a generation ago) positive correlations between pro-environmental behaviour and liberalism, socialism and education level, and negative correlations with conservatism and religiosity (Weigel 1977).

Table 3.2 Phillips' and Semple's environmental personality clusters

Group	*Characteristics*	*Personality*	*Discipline*
Unemotional technocrats	little concern for natural environment, prefer urban. Need familiar security. Low on pastoralism, communality, stimulus-seeking, antiquarianism	urban, intellectual, conservative, apathetic, restricted, blocked affect, critical, self-controlled	32% of ARCH 28% of URP Few GEOG or MES
General academics	very urbanist, very low need for privacy, high scores on adaptation, trust, and communality; environment is a resource to be used; faith in technology	urban, gregarious, socially adroit, intelligent, cultured, controlling, rule-following, planning	35% of URP few MES
Spectators	low urbanism, high stimulus-seeking; uninvolved in environmental transactions	spectator; unsure of goals and values	35% of MES few URP
Negatives	low on all scales; reject environmental influences; actively block environmental stimulation	overcontrolled, self-righteous, fearful, conscientious, isolated	16% of GEOG few ARCH
Environmentalists	high on all but urbanism, trust, and adaptation; appreciate peace and solitude of nature, artifacts from cultural past; stereotypical ES student	artistic, self-willed, high in affect	11–15% of each unit
Eco-freaks	reject urban, worship the natural with almost religious fervour; uncompromising stand against any modification of environment	vary from warm, appreciative, emotional, dreamy, to coarse, cold, intolerant, prejudiced	18% of MES 12% of GEOG
Conservationists	like eco-freaks but without emotionalism and extremism. Emphatic, ecological concern for natural environment; confident, self-sufficient nonconformity	hard-headed, managerial, versatile, opportunistic, polished, psychologically-complex	16% of MES 13% of ARCH

Source: data derived from Phillips and Semple (1978)

Source: Porteous (1996), p130.

Figure 3.2: Environmental personality clusters

It is now fairly clear that certain early environmental influences have marked effects later in life. A person's first hand experience of their environment as a child can influence their environmental attitudes, preferences for nature and the development of pastoral attitudes.

Having been brought up in an urban area is positively related to preferences for built settings and negatively to preferences for natural environments (Hoyt and Acredolo 1992), and place of upbringing (presumably a proxy for the amount of contact they may have with animals) significantly influences attitudes to animals: country children understand 'herd mentality' and see animals as commercial products, while city children favour individual animals (Arkow 2002b). As might be expected, the degree to which children 'forage' in natural settings is related to adult knowledge of biodiversity (Chipeniuk 1995). So what, one must wonder, does it foretell when children have become more familiar with cartoon creatures than real ones? (Balmford, Clegg et al. 2002).

A particularly interesting yet surely under-explored area is the way in which individual personality factors impact on orientation to the environment. It has long been known that personality effects exist on environmental attitudes (Gray 1985), for example attitudes to animals are related to sensitivity and imaginativeness (Mathews and Herzog Jr. 1997). Some personality-behaviour relationships are counter-intuitive, such as that outdoor play is not related to extraversion in middle childhood (Roberts 1978). There is even expert but anecdotal evidence of very direct links, such that abhorrence of and attempts to eradicate insect pests in farmers may be related to early childhood experiences of intrusive (sometimes sexual) touching (Hill 2003). Attempts have been made (see Figure 3.2) to codify the attitudes held by particular 'environmental personality clusters' into domains (Porteous 1996).

3.2.3 Historical and cultural factors

Since this particular evaluation of attitudes to nature has not been performed in historical and cultural isolation, but on (and within) a western industrial culture at the turn of the twenty-first century, it would be remiss by omission not to reflect on the significance of these factors in shaping such attitudes. There are indeed differences in attitudes to the environment between cultures (Abram 1996; Arbuthnot and Lingg 1975; Milton 1993; Palmer, Suggate et al. 1998a, 1998b). Patterns of attitudes, knowledge, and behaviour toward wildlife and its conservation relate to the biogeographical, cultural, and historical characteristics of each country (Kellert 1993). This is said to be because:

> *'... the overall cultural context, which serves as a blueprint for individual values, beliefs and motivations, determines both the degree to which concern will be transformed into action and the directions their influence will take.' (Beckmann, Christensen et al. Undated)*

It is equally clear that attitudes to nature in particular cultures can change markedly over historical time (Biese 1905; Brown 1999; Devereux 1996; Schama 1996). Accordingly, we will consider briefly some salient points in these fields.

The primæval human habitat was east African savannah and, rather like troupes of primates today, humans lived in small wandering groups at low population densities in a resource-abundant landscape. Such cultures tended to be relatively free of possessions as all day-to-day needs – such as tools for hunting and food preparation - were available from the skilful transformation of readily available materials. The survival necessity of personal, sensory familiarity with the potential utility of a wide variety of natural materials and the intimate awareness of how much effort each product (e.g. a tool, clothing, food) took to arrive at – in other words, the indivisibility of function from form in nature – would therefore have formed a behavioural basis for a system of values that would accord what some have called special 'reverence' for nature. Even today, indigenous people project a full range of emotions and symbols of human mythology onto their surroundings (e.g. the Mbuti of Zaire (Kenrick 1996), and Hong Kong Chinese (Anderson 1996)) that might be considered to culminate in the practice of shamanism – where animals and other nature 'spirits' are valued as equal sentient beings in a parallel world. Lest it be imagined that investing objects with spiritual power is characteristic only of pre-industrial peoples, it is as well to recall that 'modern' people believe in magic of several sorts. We like to possess photographs of those we love and may take pleasure in destroying one of someone we hate - at some level equating image with object, hoping good or bad consequences might follow. This 'sympathetic magic' is an example of the Principle of Similarity. We value a gift from a loved one; many value items that belonged to the famous. In so doing we invoke the Principle of Contagion – the belief that things will retain some influence or characteristic of the person they have been in contact with. The associations we make may be personal and recent or supra-personal, cultural connections as when expatriates display art works from their original culture (Rozin and Nemeroff 1990) but they are not dissimilar from the material associations of indigenous cultures.

Relations with animals over millennia have also had profound consequences for our thinking. The difference between nutrition and starvation in early human cultures may have rested on our facility for observing the behaviour and understanding the state of mind of prey (BBC 2003). Hunting success at a much earlier stage than was previously supposed probably involved not just our own ingenuity but also symbiotic interaction with canids. As long as 100,000 years ago, according to DNA evidence, humans and wolves were co-operating to mutual advantage like the capture of bigger game, and this development of cross-species

cognitive relationships may even have been pivotal for human evolutionary success (Ananova 2002). Domestication of animals (although some say they domesticated us! (Budiansky 1994)) has had an undoubted effect on social and perhaps even our biological evolution (Baenninger 1995) leading - it is speculated - to symbolism and therefore art. As a result our relations with animals appear to be as complex as our relations with each other. Ten distinct facets of attitudes to animals have been distinguished by Kellert (1996), including the dominionistic, scientistic, ecologistic, humanistic, moralistic and aesthetic.

As far as relations with place are concerned, the conventional wisdom is that rootless gatherer-hunting was the early norm, which was progressively superseded by settlement and a loss of mobility. Brody reverses this, maintaining that 'settled' peoples were gatherer-hunters (with an established home territory inhabited in some cases unbroken for thousands of years), whilst the 'movers' were the agriculturalists who always needed to colonise new lands since in such a system population always expands beyond what is locally supportable (Brody 2001). Fascinatingly, there may be a 'gene for' exploration linked to novelty-seeking and hyperactivity, which is more prevalent in migratory societies (Chen, Burton et al. 1999). And even something as apparently neutral as spatial thinking is subject to sociocultural influence (Gauvain 1992). It may be that the degree of hierarchy in a society relates to its degree of mobility (and thus relations to the land). Whilst gather-hunters are more egalitarian, mainly operating on division of labour and shifting authority according to the task in hand, underpinned by a complex network of relations and obligations; absolute rulers, always associated with settled societies, tend to operate with a cascading series of overseer-servant roles where superficially at least the loci of overt power are clear and unchanging (Boehm 2000; Diamond 1988, 1997; Erda and Whiten 1996).

What effect might the structure of a society have on individual personality? Certainly cultures do not all favour the same personality traits. A comparison of children in Canada and China showed that whilst shy and sensitive children were most often chosen to be friends and playmates in the far east, in north America these were among the least chosen (Chen, Rubin et al. 1992). However these differing cultures arrive at these preferences, a decade and more of reinforcement of personality traits will have its impact: it is to be assumed in the absence of better evidence that children who move cultures will adopt the interpersonal attitudes of their new playmates.

In the industrialised world economic prerogatives like urbanisation and waged labour have, perhaps inadvertently, mandated a reorganisation of our relational lives around its demands: we may as a result be suffering from endemic disturbances in our relationships (including attachments) to individuals, places and communities. 'Detached, alienated people, many of them functioning with a pathologically developed false self, barely navigate life's

challenges. Our cultural emphasis on autonomous functioning and separateness has led to a retreat from valuing interpersonal and communal dependence and has greatly contributed to a rise in the number of people whose suffering is often expressed in addictions and personality disorders.' (Walant 1995, from jacket) We have seen not only see the progressive loss of functional 'tribes' but also the emergence of women's independence, for which few foresaw the psychological consequences. Women bringing up children are more relational and less happy when working full time or not at all (i.e. isolated). Frustrated mothers affect their children's mental health (James 1998).

It seems to be an inescapable human need to construct explanations (as I do here) of how we came to be in the situation we are in: all cultures, oral and written, have stories fulfilling the role of origin myths. In oral cultures these cosmologies are fluid, adapting to the times: the advent of writing concretises them, effectively freezing time and place – raising the risk of disjunctions when they are applied at a later time, in another place. Whilst no review of this particular issue is attempted, it is notable that cosmologies meld human fact, like the deeds of ancestors, with place-specific environmental events. For example by 3,700 BME, the narrative of the protagonist of the oldest known written work, Gilgamesh, was current. In it, he was warned of a monumental flood and instructed to build a boat to save himself - a full millennium before the story of Noah circulated. Yet, far from being fanciful, geologists and marine archaeologists believe the ancient Flood may have been the aftermath of the breaking of the Mediterranean through the Bosphorus (Ryan and Pitman 1998). Another notable characteristic is the drift from polytheistic, goddess- and earth-centred mythologies to monotheistic god- and sky-centred ones, at least in the west (Gimbutas 1996). It may be that religions embody the relationship between culture and place, and that the dominance and manipulation of ecosystems inherent in agriculture was poorly served by matriarchal accounts. Certainly there is a suggestion at least that ecosystems influence religious character, e.g. Christianity and the Abrahamic faiths emphasise the asceticism and solitude characteristic of their desert origins; animism has remained powerful in species-rich temperate and tropical ecosystems, and; Buddhism arose in a settled, hierarchical tropical society.

There are also transformations in attitude to nature that occur as societal structure evolves in situ. Tuan, for example, traces diagrammatically (Figure 3.3) the historical transformation of the urban-wilderness relationship, in which isolated islands of 'sacred' human settlement in a sea of 'profane' non-human surroundings have come increasingly to invade and eventually dominate nature to the extent that prevalent modern western values consider wilderness threatened (Tuan 1974).

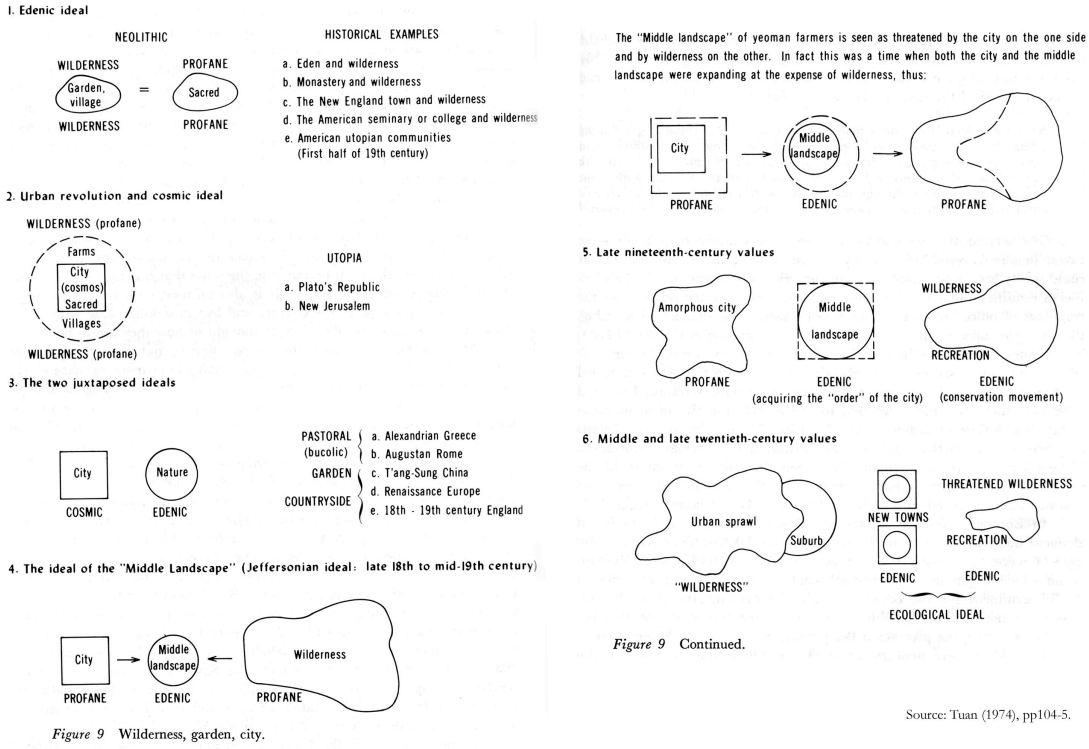


Figure 3.3: Tuan's cultural evolution of human-nature relations

The fields which hold perhaps the greatest potential for unifying these perspectives may be psychological anthropology (Bock 1994; Schwartz, White et al. 1992) and cultural psychology (Shweder 1991), which study psychological similarities and differences between cultures. They do not, however, appear to devote any noticeable attention to differences between the ecological situations of various cultures and the potential this might have for influencing psycho-cultural norms of attitudes to nature (and beyond). Nevertheless many anthropologists are aware of this issue (Ingold 1986; Kenrick 1996; Turnbull 1961/1993, 1987; Willis 1994).

In summary, it is apparent that both historical change, cultural differences and possibly even ecological circumstances can influence relations with the non-human.

3.2.4 Deliberate change: environmental education

Above and beyond innate and unintended nature-related factors of childhood (discussed at length above and in the previous chapter) there remains what some hope is an important proactive influence on the moulding of children's environmental attitudes and behaviour: environmental education. It is a field whose conventional wisdom for the last generation held

that people's attitudes were less pro-environmental than they might be due to ignorance (Arbuthnot 1974). Greater 'awareness' of the environment would (through an undefined pathway) motivate more responsible behaviour toward it. Contemporary environmental education has tended to dwell perhaps too heavily on knowledge, primarily engaging the learner's intellect. Whilst a school's curriculum can promote positive or negative attitudes to nature so, notably, can the 'hidden curriculum' in the 'naturalness' or otherwise of its grounds (Bigelow 1996; Titman 1994). Gigliotti (1990) declared environmental education to have failed, and Iozzi (1989) suggested that the 'affective domain' is the key entry point for environmental educators.

A slightly more sophisticated model assumes that more of the *right kind* of information precipitates changes in attitude that then bring about changed behaviour. These simplistic models have repeatedly been found to be inadequate: 'Many environmental education programmes are constructed on the false premise that knowledge about issues is sufficient, and that knowledge by itself will lead to action.' (Hungerford and Volk 1990) cited in (Chawla 1998a). There is also a danger that in delivering classroom-bound environmental information, contact with the object of study is squeezed out, since 'the more children are insulated from direct contact with (nature) … the greater the influence assumed by parents, peers, media and teachers' (Chawla and Hart 1995).

Environmental education aims to create an active and informed citizenry that will work to maintain a varied, beautiful and resource-rich planet for future generations. One might therefore expect that the kinds of learning experiences that produce such persons would be well known and understood. But as late as 1980 Tanner pointed out that the discipline was devoid of research addressing this. We now know that environmental education can enhance pro-environmental attitudes and encourage environmentally responsible behaviour in the short-term (Armstrong and Impara 1991). But, effectively, in the absence of any long-term prospective research on its effects, we still do not know whether it works (Sterling 2002).

The technique of Significant Life Experience (SLE) research was created to begin to fill this knowledge void by, as it were, looking down the other end of the telescope. If we were not sure what drove environmentalists to their enthusiasm, perhaps we should ask them. Tanner began with a survey of autobiographic recall of important personal influences among 'informed citizen (environmental) activists' – importantly giving no cues as to what sort of influences were sought (Tanner 1980). Tanner found his respondents overwhelmingly claimed to be motivated to their present concerns by positive, not negative, experiences, and that they most often mentioned as influences playing or walking outdoors, and parents and teachers (for their personalities, not the courses they taught). This accorded with his earlier

hypothesis that children must first come to know and love the natural world before they can become concerned with its care (Tanner cited in Palmer 1993).

Palmer, Suggate and colleagues have since firmly substantiated SLE research with a body of work on 'Emergent Environmentalism', which replicates the primacy of these influences cross-culturally (Palmer 1993; Palmer and Suggate 1996; Palmer, Suggate et al. 1998a, b; 1999), whilst acknowledging the existence of cultural differences.

In an attempt to systematise the intriguing but methodologically opaque work of Cobb (1993) which suggested that the genesis of adult imaginativeness lay in a 'spirit of place' encountered first in middle childhood, Chawla (1986) extracted from a variety of twentieth-century autobiographies specific mentions of the child's surroundings. Codifying these, a typography of environmental memory was identified (see Table 9.1). Particularly common for those who turned out to be what she termed 'creative thinkers' were experiences of 'transcendence' characterised by identification with the natural environment and enduring inspiration, always having occurred in a context of freedom and solitude. Subsequently, a firmer link between an 'artistic turn of mind' and deeply personalised, 'ecstatic' memories, usually of being alone in (what seemed to the child to be) wild outdoor places, with the additional characteristic of the presence of a source of unconditional (human) love, was established (Chawla 1990) – but also from autobiographies. Chawla too has published repeatedly in the SLE idiom, reconfirming and increasing detailed understanding of the original findings (Chawla 1998a, b, c; 1999; 2001). Further qualitative detail has recently been added to these descriptions (Corcoran 1999), but *still* sourced from environmental educators. Other recent work has begun to question the role of the teacher and how they should respond to these findings (Payne, Phillip 1999).

The work of Tanner, Palmer, Chawla and others is undoubtedly valuable in identifying probable causative influences, but problematic as it is open to the criticism of being circular and self-fulfilling. Of course environmental enthusiasts will remember the environment happily! Unfortunately, the method has another inbuilt methodological limitation: it is, apparently in all cases, the result of autobiographic recall. As Chawla (Chawla 1999) admits, for lack of comparison groups these studies do 'not show that these antecedents distinguish environmentally committed people from the general public'. Sia's scale of people's sensitivity to the environment has been used (Sia, Hungerford et al. 1985/6; Sivek and Hungerford 1989/90) to distinguish between those who are more or less environmentally active, but that too is in danger of being self-fulfilling. Chawla admits of numerous other ongoing weaknesses in SLE work (Chawla 1998a) but curiously never proposes quantitative methods. There remains scant work examining their thesis with those who hold less strong, no, or anti-environmental views.

It is interesting to reflect at this point on the claims that a slightly different group, naturalists, make about why choose their particular vocation. It has often been reported anecdotally that empathic or awe-laden emotive connections with the subject of study have played and continue to play a part (Goodall 1996; Wilson 1984). Eminent primatologists have testified to their 'feeling' the animal's personality upon eye contact or their 'heart missing beats'. Stretching the point further, biologists such as Jonas Salk say they attempt to imagine their way into the organism's predicament, even if it is a virus (Verbeek and de Waal 2002). There are interesting parallels in some of these descriptions with what Freud called the 'oceanic state', a term borrowed from Walt Whitman (Thorsen 1983), and with what Levy-Bruhl described as the 'participation mystique' where 'the subject is unable to distinguish himself clearly from the object to which he is bound...' in 'an a priori one-ness of subject and object' which he suggests is a 'primordial condition' experienced only by individuals of 'les societies inferieures' (Jung, Hull et al. 1971/1923).

It begins to seem that environmental education which aims to engender ecocentrism may need to focus on safely guiding participants to an experience of what has been termed the 'ecological self', after which environmentally irresponsible behaviour is unthinkable (Naess 1989), rather than transmitting information. Hence, as out of favour as environmental education may have become, it may not be an invalid exercise, merely insufficiently proven. If instead of didactic gorging on facts it can reliably furnish children with opportunities to experience the emotional states just described in direct contact with nature, which some schools of thought certainly strive for (Cornell 1989; Cornell 1979; Van Matre 1990), it is at least likely to deliver a generation retaining some level of connection with the non-human.

3.2.5 'Ordinary ecstasy': outdoor recreation

Few nomadic humans remain. An increasing majority of us, not necessarily through personal choice, live in settled societies. Yet our thirst for contact with nature lingers. Though interactions with animals and place – our day-to-day habitat - have been discussed in the previous chapter in the context of attachment, the reader will appreciate the parallels here. For many, however, these things do not fully answer our need. Whether in the guise of 'hobby', 'sport', 'exercise' or 'getting away from it all', recreation in natural surroundings is an increasingly popular (partial) antidote to the pressures of urban life (Cordell and McKinney 1999), and a significant economic force (Higgins 2000). Why so?

While commuting is known to induce stress (Novaco, Stokols et al. 1979), people routinely use accessible nature to find solace (Rohde and Kendle 1994), and reduce stress by taking a walk in a the woods (Bussey 1995). The same is undoubtedly true for other low

physical demand hobbies that take place in nature, like fishing and gardening. That an attachment-like behaviour is involved is betrayed by the fact that tourists feel emotional attachment to their destinations (Changuk Lee 1998; Eisenhauer, Krannich et al. 2000) and that childhood experience of woodlands is the best predictor of adult use of them (Ward Thompson, Aspinall et al. 2002). But even with more physically demanding activity, the theme of attachment is evident: the extent to which recreationists identify with the location of their sport is related to how enthusiastically they pursue the activity (Bricker and Kerstetter 2000). It does not seem to be primarily a question of vigour: climbers seek in the main not to take absolute risks but to pose themselves personal challenges related to their experience (Ewert 1994) – exploring the boundaries at which they feel challenged but able to return to safety.

The field of outdoor and adventure education also seeks to capitalise on the attractions the outdoors offers (though environmental education might take place outdoors, they are *not* the same thing (Parkin 1998)). Adventure education increases environmental sensitivity among teenagers (Metzger and McEwen 1999), and benefits the mentally ill (raising self-esteem, lowering depression and increasing trust in the schizoid) (Kelley, Coursey et al. 1997). Women's groups undertaking even short duration nature-based physical activities have found them to be a trigger for major changes in lifestyle and attitudes in cases of depression or anxiety (Kessell 1994), and in the case of wilderness experience, psychological healing (Calder 2003; Friese, Pittman et al. 1995; Glassman 1995; Greenway 1996).This 'transformational' learning – a step change from one qualitative state to another (Cranton 1994) - is an effect sought in professional development (Cranton 1996) and business (Torbert and Fisher 1995).

But the ethos with which these courses are run seems critical. There seem to be two contrasting orientations toward outdoor educational activity: to 'conquer' or to 'befriend' nature. Outward Bound (OB)-style courses have on the one hand had a reputation for being very physically and mentally challenging, whereas 'nature study' courses have been seen as somewhat 'touchy-feely'. But it is important that instructors be sensitive to their students' needs, since OB courses can overstress and re-traumatise combat veterans suffering from post-traumatic stress disorder (Hyer, Boyd et al. 1996).

What is the common thread of outdoor recreation? Csikszentmihalyi (1991) would suggest 'flow', a total, pleasurable absorption in the task at hand during which time seems to stand still, and which can lead to profound and lasting changes in environmental attitudes. However the place and the circumstances may be more responsible for the epiphany than the activity. A continuum of effects from momentary and ecstatic to repeated and more mundane – even subconscious – encounters can have a similar longer-term effect. In either case the

experience does not require particular skill or risk-taking (Key 2003). A common factor in the many available descriptions is a momentary sense of egolessness – the loss of the 'I' that monitors the 'me' – and a transcendent sense of union with a greater whole. It is an experience that everyone is said to have from time to time, though more often those who are 'self actualised' (Maslow 1962); and tends to leave people with a lasting conviction of having gained great knowledge and insight (James 1960) into the connectedness of everything (Key 2003).

This is strikingly similar to remembered blissful childhood experiences among the creatively inspired and the enthusiastically pro-environmental. It is also reminiscent of descriptions of states induced by hallucinogens, an example of the 'peak experiences' described by Maslow and later by Grof as an experience of 'cosmic unity'. Its characteristics are transcendence of the subject-object dichotomy, exceptionally strong positive affect (peace, tranquility, joy, serenity, and bliss), a feeling of sacredness, transcendence of time and space, an experience of pure being, and a richness of insights of cosmic relevance. Subjects frequently talk about timelessness and say they are in touch with infinity (Grof 1976). However, despite Maslow's desire to establish a 'science of religion' by demonstrating that all so-called spiritual experiences are at root this same phenomenon (Thorsen 1983), and his surveying a wide body of evidence, he curiously failed to include experiences of the natural world, of which even William James had said in 1902:

> *'Certain aspects of nature seem to have a peculiar power of awakening such mystical moods.' (James, William 1960)*

Of course, this was not new even then: half a century earlier John Muir, and half a century before him Wordsworth, captured similar sentiments. Indeed it may be that the intuition of such feelings is primal, inseparable from the contentment of any animal securely at home in its natural surroundings.

Interestingly there are other approaches which seek to generate these types of experiences for adults, for example psychotherapeutic interventions involving nature, generically termed ecotherapy (Burns 1998; Clinebell 1996) which claim success in individual transformation, but have been criticised for being excessively individualistic. Another not unrelated field of examples would be the group exercises used in experiential deep ecology, which entails collective rituals and so-called despair and empowerment work (Macy 1991b; Macy and Young Brown 1998; Seed, Macy et al. 1988), and perhaps even nature-worship rituals of paganism and Wicca.

Chapter 4: Questions arising and hypotheses for investigation

4.1 Unanswered questions concerning attachment and environmentalism

Having reviewed the literatures on both self-in relation and the formation of attitudes and behaviours toward nature, it is clear that there are many unanswered questions. This chapter attempts to put some of these questions into the context of a generic experience-attitudes-behaviour model, from which a number of testable hypotheses are formulated.

There is a wide variety of attitudes and behaviours toward the non-human. There has however been a limited amount of work, especially quantitative, on the relation between early experience and environmental attitudes and behaviour. In particular, though qualitative analyses have suggested a relationship between adult environmental attitudes and childhood contact with nature in recollections such as autobiography, there has been no confirmation of this by other than prompted recall in a population of strongly pro-environmental 'activists'. Other potential 'influences' mooted include the attitudes of caretaker adults, siblings, and contact with companion animals or nature 'proxies' (such as toys and media representations). Nor, supposing one or more such causative relationships exist, has there been a broader exploration of the qualitative factors in childhood experience that contribute to pro- or anti-environmental attitudes.

The reasons for the failure to address these important uninvestigated issues in this manner are not the central subject of this project, but they could include research difficulties, cultural or disciplinary blind spots, the fact that the answers seem obvious to those who have thought about the issues, or to others insignificant, or even a failure to discern the fact that there are questions worth addressing.

One dimension of early experience in particular, attachment, is concerned with exploration, secure-base behaviour, and conceptions of empathy in others. Attachment style, which is established in the first few years of life in interaction with emotionally salient others (including but not limited to principal caregivers), persists to some degree into later adult-adult relationships. However not all emotionally significant relationships in childhood are with humans: attachment relations are for instance known to develop with companion

animals. It has also been suggested that attachment may extend beyond sentient animals, potentially to 'lesser' creatures, plants, trees and even places and landscapes.

It is clear that attachment style relates in a complex but predictable fashion to personality traits (Diehl, Elnick et al. 1998; Leveridge 1998; Meyers 1998), and indeed there are even personality differences between adults who had childhood attachments to 'transitional objects' and those who did not (Cohen and Clark 1984). Personality is in turn predictive of attitudes to animals and pro-environmental behaviour (Balderjahn 1988; Mathews and Herzog Jr. 1997).

It might therefore by extension be hypothesized that attitudes to the environment may relate in some fashion to attachment to parents and perhaps to other attachment objects including animals, nature and place, and that behaviour toward the environment flows from attitudes so formed. In addition, or alternatively, it may be that adult behaviours to nature are related directly to childhood experience of nature, or to the behaviour the child witnesses in adults around them.

For simplicity, the set of multifactorial working hypotheses emerging above will from now on be referred to generically as the 'Attachment to nature' hypothesis. The null hypothesis is of course the inverse – that none of human, animal and non-sentient ('place' or sometimes 'environment' being used as loose shorthand for non-sentient influences) experiences nor attachment styles predict attitudes and behaviours to the environment.

These arguments suggest an account of the origination of environmental attitudes and behaviour that is best summarized diagrammatically, as follows. Solid lines represent the conventional experience-attitude-behaviour model, dashed lines represent the possibility that childhood factors may influence adult behaviour, without necessarily according with adult attitudes.

The model rests on a number of alleged relationships between variables, some of which are poorly established and some of which are purely speculative. It therefore appears that an investigation into the relationships between these factors could act as a simultaneous test of several theories. It is not the intention to 'prove' the model overall, based as it is on generic experience-attitude-behaviour theory, but selectively to examine certain possible strands within it relating to the ideas previously reviewed. Stated as hypotheses, the relationships can be described as a number of major and minor postulations, as follows.

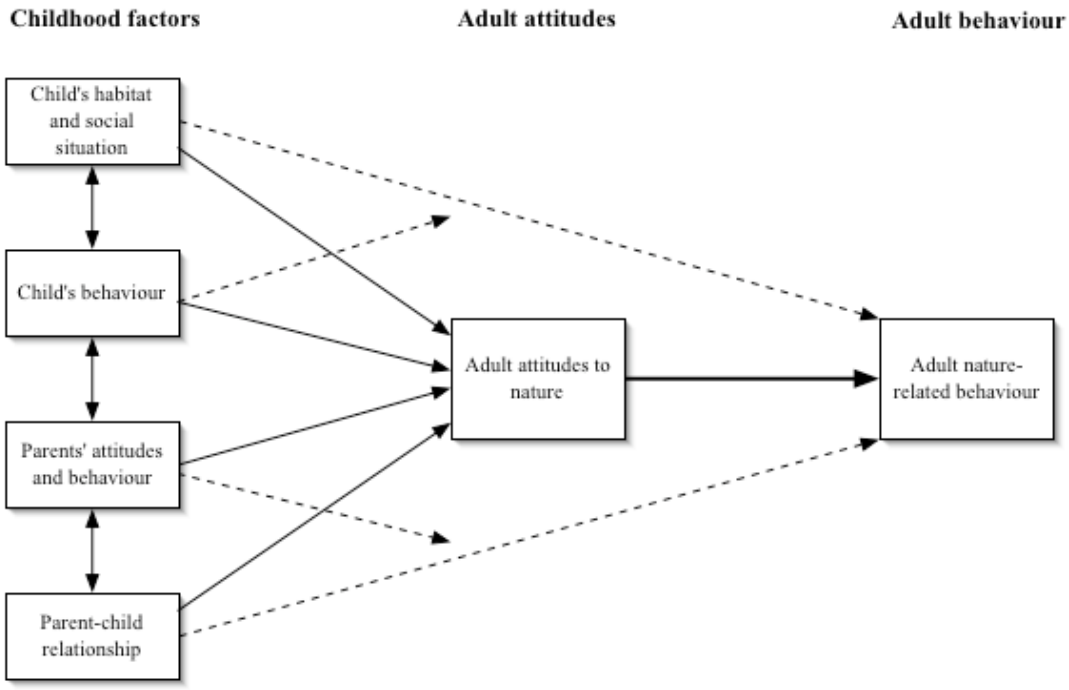


Figure 4.1: A model for the origination of environmental attitudes and behaviour

4.2 Major hypotheses

- *One: Adult attitudes to nature are related to parental attachment status*

- *Two: Adult attitudes to nature are affected by direct contact with nature as a child*

- *Three: Adult attitudes to nature are affected by parental behaviour*

A series of further relationships bearing on the same questions but according to existing evidence probably less important may also be proposed.

4.3 Minor hypotheses

- *Four: Adult attitudes to nature are affected by indirect and vicarious experience of nature as a child*

- *Five: Adult attitudes to nature are affected by the size and nature of the animal and human 'menagerie' the child grows up in*

- *Six: Adult attitudes to nature are affected by social factors*

- *Seven: Adult behaviour toward nature is shaped by childhood factors, independently of adult attitudes (e.g. habit)*

4.4 Wider utility of such an investigation

An investigation of these relationships, which has been touched upon in previous work but not addressed theoretically or methodologically in the manner proposed, would have wider utility as an opportunity to relate hitherto relatively distinct and poorly linked areas of social and developmental psychology. It is not novel to suggest that both interpersonal and environmental experience have synergistic effects in development, but it is an inadequately explored area with regard to environmental attitudes and behaviours. Such an investigation has the potential to bring a degree of integration between theories of personality and environmental attitude-behaviour, and open new avenues for subsequent work. Whatever the nature of the results they would be applicable not only within environmental psychology and environmental studies, but also potentially have ramifications for developmental and personality psychology and perhaps anthropology, education and politics. What is more, given the availability – as will be described - of a variety of well-used experimental instruments useful in measuring a number of the variables, it becomes an achievable task for a single investigator.

Chapter 5: Methodology

This chapter in turn reviews the possible methods that could have been used to carry out this research and, after arriving at a decision on which to employ, recounts in detail what was done to gather the data.

5.1 Review of methodological alternatives

Firstly, consideration is given to what data must be gathered in order to test the various hypotheses; secondly, how to select the cohort of subjects and; thirdly, what means might be employed to obtain the information from the selected cohort.

In social sciences quantitative and qualitative research techniques are complementary. The insufficiency of quantitative work on childhood experiences of and subsequent adult attitudes to nature and the availability of some good qualitative work, albeit largely with environmental educators, documenting the subjective roots of environmentalism, were factors in the decision to make an investigation of the former kind. However a more important consideration was the potential utility of any results of this kind in the present state of knowledge.

Attachments, including those that cross the species barrier, are accepted as a primary influence on development of knowledge, skills and attitudes, with mechanisms now being explained even down to the biochemical level. It seemed important to test whether the attachment concept applied in a wider range of situations than had hitherto been postulated. The mechanism of an attachment to nature was, it was supposed, unlikely to be different from that between parent and child, but its occurrence had not been demonstrated. Furthermore, if 'attachment to nature' does exist, then a demonstration of strong correlations with the factors most likely to be salient would be a foundation for further work, including investigation of the qualitative explications of mechanism. Autobiographical methods cannot be expected to provide the information needed, given the potential for biases in recollection of past memories, which are as likely to be coloured by differences in individual experience at any stage of life, as well as by collective feelings and ideas. The most logical investigation was a quantitative survey involving a considerable amount of data gathering on subjects' personal experience of nature in childhood.

Clearly, an investigation of the as yet poorly explained relationships between the various forces affecting attitudes to nature requires both a quantitative survey of the gross outcomes of, for example, having grown up isolated from direct experience of nature, and a qualitative analysis of how and why the relationships exist.

5.1.1 What information is required?

The areas for investigation can be conceived as a 2 x 3 matrix, as follows:

Area of interest / Life stage >	Child	Adult
Attachment	To parents	To nature
Attitudes and beliefs	Of parents	Regarding nature
Behaviour and experiences	Related to nature	Related to nature

Table 5.1: Matrix of areas for investigation

Qualitative, autobiographical investigations of the relationship between adult attitudes to nature and childhood experience have been carried out (Palmer, Corcoran et al. 1996; Palmer 1993; Palmer and Suggate 1996) and there exists a considerable body of environmental attitude-behaviour research. However there appears to be no quantitative investigation of childhood nature experience, nor any work that directly addresses attachment effects. There may be good reasons for this absence: an investigation of the relationships between childhood nature experiences and adult attitudes and behaviour toward the non-human requires data about two time periods, which is inevitably problematic. For childhood experiences of nature, it was necessary to gather data about:

- Demographic status of the informants' families;
- Childhood experiences and behaviour in relation to nature;
- Overt and unintended parental influences on childhood activity and 'play';
- Parental behaviour toward the environment;
- Attachment status of child to parents.

As far as childhood circumstances are concerned, 'experiences' of the non-human must be taken to include pets, vicarious experiences of nature such as books and broadcast media, particular enthusiasms of the child itself (e.g. nature-related hobbies), and the immediate physical surroundings and qualities of the place the child grows up in. On that note, it might

be asked why not look at ecosystem or vegetative surroundings or at least activities involving plants. After all there are available indices that measure the cognitive, emotional, social and psychological effects of therapeutic interaction with plants: Azar and Conroy's scale (1989) for this has strong internal consistency (r=.947) and construct validity. However it was designed to be completed by horticultural therapists, not clients, and principal components analysis revealed factors of skills in basic work, community, communication, organization and the ability to deal with authority – none being dimensions over which clarification is sought here. Nevertheless the possible influence of vegetation and topography remains an interesting potential sphere of influence for future workers.

For assessment of adult attitudes, the following information is required:

- Adult demographics;
- The adult subject's attitudes and beliefs about the non-human environment itself and its relation to human concerns;
- Their behaviour toward the environment.

The attachment dimension in particular requires some thought. Human-pet attachment relationships have been delineated in four dimensions (Melson 1990):

- Time spent with and activities directed toward the pet;
- Interest in and affect (feelings) toward the pet;
- Cognitive constructs developed about the pet and the relationship itself, and;
- Behavioural responsiveness to the pet and its needs.

By analogy, four similar dimensions of 'attachment' to nature might be conceived as:

- Time spent in contact with nature and activities in nature;
- Affective responses toward nature;
- Attitudes and beliefs about nature and human relationships with it;
- Behaviour when in or with nature.

Following the conceptual model of this investigation, information therefore needs to be gathered for each of these four potential dimensions of human-nature attachment.

5.1.2 Kinds of cohorts

The following options for what type of cohort to employ were considered:

- Prospective survey of different subjects
- Prospective survey of the same subjects
- Post hoc survey of different subjects
- Post hoc survey of the same subjects

A *prospective survey of different subjects* might begin with groups known to be dissimilar (e.g. children born in the country versus children born in the city; children of eco-enthusiasts versus children of technocentrists). One of these could be a randomly selected control group with which the experimental group could be compared. Given that the hypothesis calls for an effect of place of upbringing and this is unavoidably defined for most children, there seems little advantage of attempting to operate with an artificially created control group rather than one which acknowledges from the outset that the participants fall into known dissimilar groups. It is difficult to decide what constitutes 'normality' in terms of home place, when the conditions of upbringing are so clearly culturally and economically determined. A mixture of chosen numbers of city and country children might not usefully measure anything but what happens when you mathematically homogenise differing groups. To increase the viability of the study or to allow it to start with smaller numbers one could start out with a known cohort and keep replacing any dropouts with matched new subjects. But this would risk impairing the integrity of research aimed at assessing the effect of an as-yet inadequately understood set of influences.

The overarching problem of investigating the effect of one set of experiences on later behaviour is accessing accurate information about both time periods. The ideal is *a prospective survey of same subjects* where individuals are followed from beginning to end. This would address most of the problems of gaining access to the childhood experience of adults; however no technique can unarguably allow access to the experience of childhood

since it is subjective. Even asking children themselves can throw up significant distortions in, for instance, their restricted use of language or self-understanding. However being able to corroborate such witness with the later recollections of the same people as adults may be the best way of checking for such bias.

The optimal design would be to follow a group of children from infancy (or, if Fonagy's proven model of the intergenerational transmission of attachment status is to be adhered to, also including an assessment of the prospective parents before the child is born), making the group large enough and broad enough to cope with the various home and environmental surroundings, changes in habitation, parental habits, and perhaps personality types (of both parents and children), through to adulthood. For statistical validity this would probably require at least five hundred and perhaps twice that number of initial participants in order to be sure that sufficient remained in the project over such a lengthy time scale.

Effectively, this not only pragmatically rules out such an approach for an individual even assuming their initial commitment (there being no guarantee that the researcher would indeed be there to complete the project over what could be a 25 year period), but for similar reasons it would only really be within the scope of a national or international research-council effort which could maintain the priority of and the funding for periodic follow ups. There have been examples of projects of this scope (e.g. Framingham heart study); for the results to be meaningful such a project would have to be on that scale. A shorter-scale effort of perhaps a decade may evidentially be worth pursuing, but it is obviously not within the provenance of a lone researcher.

Alternatively, *a post hoc survey of different subjects* might ask one group about childhood experience and another (which may or may not be overlapping in dimensions the researcher may or may not be aware of) about their adult experience. This approach might suggest themes that could link the two phases of life, may permit maximum extraction of descriptive detail and would perhaps be the most convenient for any researcher, but would be the least satisfactory design of these alternatives for the prescribed purpose given that it is least likely to illuminate causation. In any case, in assuming that subjects are truthful and accurate about the majority of details of the place in which they grew up, it mimics a prospective survey of dissimilar subjects to some extent.

In *a post hoc survey of same subjects*, adults are available to be asked about their present and past experience in a convenient one-hit survey, although this is obviously subject to the truthfulness and accuracy with which subjects give information. Potential subjects can be invited to participate on the basis of known, relevant criteria. For example, those who currently live in a particular kind of surroundings may be more likely than the average

person to have lived in a similar place as a child: hence an invitation to country adults would probably yield a greater proportion of country children than a similar invitation to urban adults. Unlike prospective studies, the number of participants within sub-groups is much more easily controlled: if too few respond the experimenter can make renewed efforts to gain additional responses from the groups from whom they are lacking, for example particular vocational or age groups. Such a design is likely to make it statistically easier to discern and estimate the size of effects of experiences on individuals and groups of similar individuals. It also has the advantage that participants can be asked for information about any time in their lives, which is a useful next-best approach for accessing childhood experience.

In conclusion, therefore, *a post hoc survey of same subjects* became the chosen cohort selection method.

5.1.3 Types of data gathering

Having decided how the participants should be selected, it remains to be decided by what means the required information should be gathered from them. The choice is to use a direct or face-to-face method of data gathering such as observation or interview, as against an indirect method, such as a questionnaire or secondary sources.

While *observation* (also termed ethological) methods would present no insurmountable obstacles to gathering data on adult and child behaviour in relation to nature (and this has been done, clearly demonstrating greater accuracy than subject recall), for large numbers they would obviously be cumbersome and time consuming. Without further communication and supplementary methods it would also be impossible to infer more than minimal detail about the subjects intentions or feelings. Critically, this method could not yield some critical data about attitudes underlying particular behaviours that this model requires, nor anything on correlations between child and adult behaviour in individuals and perhaps in groups. However, analogously to the ‘strange situation’ attachment test, it may be that observation of subjects in nature surroundings could illustrate patterns of behaviour that might substantiate notions of inner factors or inferences that help to confirm or disconfirm aspects of the hypotheses. This may be helpful in future research in this area.

Gathering data through *interviews* may prove uniquely useful in seeking a depth of qualitative detail, such as in trying to elucidate interesting suggested relationships between experience and attitudes. However where the goal is statistically valid relationships, the time and effort involved for each subject can outweigh the additional value, as without an enormous input of experimenter time the numbers of subjects would be too small to result in

statistical validity. In addition, the analysis of interview data commonly involves interpretation, although discourse analysis along the lines of Potter and Wetherall (1993) was considered and may be fruitful for a complementary study. There are a variety of approaches to interviews, differing as to the degree of prior preparation and the extent to which the interviewer controls the subject matter discussed.

Structured interviews are prone to the problem of experimenter bias insofar as results may unconsciously reflect acknowledged or unacknowledged assumptions and will fail to capture data outside the model being tested. However where the information sought is factual and straightforward (involving little speculative thought or discursive responses on the subject's part, easily recalled and likely to be divulged without demur), this method can be highly productive, though given time constraints the numbers of interviews a single researcher can aspire to are still likely to be limited to two figures.

Semi-structured interviews involve a more discursive conversational style, where questions may be somewhat open-ended and answers can be led where the subject is prepared to give the most detail, can be useful in some circumstances. It does require vigilance on the interviewer's part to keep the subject matter broadly on track. This could have been employed in this case but again the numbers would probably have proven too small.

Unstructured interviews have been characterized as a wholly 'conversational' or 'fishing expedition' type of interview, which can yield interesting results relevant to this area of research (for instance by asking open ended questions like 'what is your earliest memory?'), but can also be very time consuming (particularly in the analysis stage, where coding methods have to be created afresh) and without a prior agenda on the part of the interviewer may not cover the issues relevant to the research goal. Given this, it was judged not relevant to the enquiry.

It is clear that a good deal of descriptive, qualitative evidence and speculation (based, for instance, on examination of collated autobiographies and semi-structured interviews) has been accumulated about the origins of environmental attitudes. However there is insufficient confirmatory quantitative work. Therefore, primarily for this reason, interviews were rejected as a technique to be used in the evidence gathering designed to examine childhood experience-adult behaviour correlations. Nevertheless, the potential for interview data to supplement and deepen understanding of mechanisms was borne in mind and therefore a question was included at the end of the questionnaire asking subjects to volunteer their willingness to be interviewed at some later stage. A significant number did, and these contact

details are available for later use, should the author or approved others so choose in pursuing subsequent research.

We now turn to the possibility of gathering data through the use of questionnaires. This method has a number of *advantages* that would be useful in a project of this nature:

- Ability to target to specific audiences, anywhere;
- Freedom to mix question types (e.g. yes/no; Likert scale; open-ended);
- Reservoir of prior validated scales and precedents;
- Ease of piloting and revision;
- Optional length and number of questions;
- Diminished opportunity for investigator bias (beyond that in assembling the instrument);
- Choice of delivery and completion methods (see below);
- All participants are asked for the same information;
- Ease of mass administration;
- Relatively rapid analysis of data.

There are however also a series of *disadvantages*, including:

- Exclusion of data not specifically solicited or included in the 'model';
- Limited response length and detail;
- Potential for ambiguity of questions;
- Question order can affect answers; this is the case in environmental attitude scores (Armstrong and Impara 1990);
- Layout, grammar, typeface and presentation (paper/web, sheets/booklet) may affect answers;
- Omission of those who dislike questionnaires, who are sub-literate or not available to be offered the item;
- Possibility of participants systematically avoiding certain questions.

However the most influential choice to be made is who is to complete the questionnaire. *Experimenter-completed* questionnaires are:

- More likely to be filled in accurately;
- More likely to have all questions completed;
- Potentially less likely to assess subtleties;
- Likely to guarantee a higher response rate.

Participant-completed questionnaires on the other hand are:

- More likely not to be attempted;
- More prone to error and partial completion;
- May allow more time to be spent at it, which may result in more accurate answers;
- More likely to be abandoned part way through and hence not returned.

There is also a more subtle set of problems inherent in any self-report (e.g. illegibility, selective response, misunderstanding, mis- and selective recall, wishful thinking, deliberate and unintentional misrepresentation, deception). The answers people give to surveys are often not a highly dependable representation of real behaviour (Weigel 1983); measuring what people actually do can reveal closer links between attitudes and behaviour (Hines, Hungerford et al. 1986). However, given the practical impossibility of observing long-term behaviour in tandem with the other variables required in this research, the lesser reliability of self-report still allows for sufficient utility (Stern and Oskamp 1987; Warriner, McDougall et al. 1984).

Finally there are the potential errors that can be introduced in subsequent data manipulation (e.g. investigator, typist or coder misreading of data, mistyping, miscounting, miscalculation, misinterpretation of meaning, misrelating data).

One other possibility is to consider whether this PhD could have been conducted in an entirely theoretical mode, utilising solely *secondary sources* of information. In principle,

since a comprehensive theory of human-nature relations has yet to be accepted and tested, it may be that speculations on a model for such would be a productive investigation. However, the nascent field of 'ecopsychology' is without an articulating framework as it includes insights and postulates from a panoply of disciplines and traditions that have hitherto not been considered mutually compatible. Fisher has recently attempted to provide an over-arching conceptual framework (Fisher 2002) but it is heavily philosophical and does not readily offer itself to scientific testing.

There is clearly not enough empirical, quantitative work in this area. Given the ongoing elucidation of attachment mechanisms and functioning in child and developmental psychology, burgeoning extensions to attachment theory arising in companion animal research, the body of work within geography on place attachment and the deluge of prose works testifying to the impact of childhood experience of nature, it is clear that further theoretical work in this area would have risked reiterating what others had eloquently described or, worse, repeating unsupported assertions about human-nature relations already stated ad nauseam elsewhere.

Clearly, the as yet poorly explained relationships between these forces will require both a quantitative survey of the gross outcomes of, for example, having grown up distant from nature – to which this is a small contribution, and a qualitative analysis of how and why that should be, for a comprehensive understanding to develop.

However, for the purposes of this investigation, it appeared that a questionnaire instrument was the only methodology that could systematically deliver sufficient volumes of data on a large number of variables, from hundreds of selected participants, by one researcher, for a reasonable investment of time and effort, to yield information that could throw quantitative light on the model. This was therefore the method pursued.

5.2 The methodology adopted

Having arrived at a decision on how to gather the data and from whom, the practicalities of doing so must follow. Here we will firstly identify which groups of subjects were chosen and why, how the questionnaire was delivered, who responded and to what degree; secondly, how the questionnaire was developed, and; thirdly, how the resultant data was prepared for analysis.

5.2.1 Participants

In this section we will look at why certain groups were chosen for sampling, how they were brought into the research, and the demographic characteristics of the respondents.

5.2.1.1 Sample groups

Within the practical limitations of availability within the given time, distance and financial constraints, a selection of groups was chosen for participation principally for their probable broad distribution along O'Riordan's axis of ecocentrism-technocentrism (see Procedures for how these samples were obtained). These were as follows:

- Earth First! - radical 'eco-warriors', some of whom were 'living simply' and/or outdoors;
- CHE – students of a Masters degree in 'Human Ecology' from a small graduate school espousing 'deep green' values;
- VUB – ethnically diverse international students of a Masters degree in 'Human Ecology' from a Belgian university espousing 'light green' values;
- Nature Quango[3] – likely to be ecologically-minded but given their responsibilities probably pragmatic;
- Choir - urban with arguably irrelevant interests (a potential control group: it became evident that their distribution – see below – was not appropriate for this);
- Foresters - pragmatic outdoors types from wide social background, not generally dealing professionally with animals;
- Farmers - tending to be from rural, often socially conservative backgrounds and commonly dealing with animals, including first-hand death and killing;
- Biotechnologists - strongly scientifically educated and applying manipulative techniques to the control of nature, but at a remove;
- Economists - Undergraduate year 2 economics class, University of Edinburgh;
- Engineers – employees of a large defence electronics contractor.

[3] Quango = 'Quasi-autonomous Non-Governmental Organisation'

In the case of several disparate, informal organisations (e.g. Earth First!), there was a need to deploy questionnaires when they were gathered together, so the author had to attend group meetings. Others were available by post and by internal mail systems (see Procedures, below). Further groups that were considered and not used were:

- Environmental organization supporters;
- Abattoir workers;
- Local authority employees;
- Undergraduate engineering and law students;
- Nuclear industry employees;
- Oil industry employees.

There were no outright refusals from groups that were approached by telephone followed by an explanatory letter. However among these groups there was a degree of involuntary elimination due to responses following enquiries to the responsible person (e.g. the nuclear employer accepted, then changed their mind; oil industry manager would have been willing but had recently done a company-wide questionnaire and felt the timing was internally inappropriate). Others were not pursued as targets for diversity and numbers of respondents were met before they would have been required.

5.2.1.2 Administration and responses

Whilst Dillman's 'total design method' (1978) including persistent follow-up reminders may be the ideal for achieving high and optimally representative samples, samples in this project had to taken more opportunistically, as and when groups of suitable candidates became available. Groups were chosen incrementally with the goal of achieving a spread of environmental values from technocentric to ecocentric, an approximate reflection of general population age and sex distribution, a selection of vocations with relevance to 'nature' and, finally, sufficient numbers.

The questionnaire was handed in person to groups of radical environmentalists at a conference, international students on a local field trip, economics undergraduates at a lecture, a suburban choir at rehearsals, and miscellaneous others at a small graduate school of environmental studies; postally to groups of farmers and foresters, and; by internal

organisational mail services to staff of a government conservation agency, a defence electronics firm, and a biotechnology research organisation.

The questionnaire was given with one of three introductions: a personal (face-to-face) explanation; a group (face-to-face) explanation, or; a covering letter explaining what was wanted and mentioning that permission had been given by the subject's employer or professional group. There was of course potential that these approaches may have had different effects on willingness to complete and return, but results do not bear this out. In addition, within the selected groups respondents were self-selected in the sense of willingness to respond. Some returned the questionnaire by hand at the time or later, some by post (usually in the enclosed stamped addressed envelope), and the remainder via internal organisational mail systems.

Sampling took place in two stages, the first commencing in July 1997 and continuing until mid-1998, and a second phase beginning in mid-2001. By October 2001 what turned out to be the final tranche of questionnaires was circulated. Shortly afterwards the self-determined minimum response total of 200 (Lemeshow, Hosmer et al. 1990) returned and fully completed scripts from respondents was achieved and further distribution ceased. Further returned scripts continued to drift in by mail and by hand sporadically until January 2002, at which point the dataset was closed for analysis at 294 respondents.

The overall sample size is considerably larger than originally intended due to a longer than planned sampling phase, a slightly higher response rate than expected and unexpected permission having been given at a late stage to poll two large groups. Three sub-groups had 10 or less respondents (CHE, Economists, Electronics) - probably too few for meaningful conclusions to be drawn about these groups. The groups constituting Ecoradicals, Nature Quango and International Students have numbers in the high teens and twenties that may permit conclusions to be drawn about these groups with an intermediate level of certainty. Farmers, Foresters, Biotechnologists and Choir all have at least 39 respondents and constitute the most reliable body for analysis.

Group response rates for each sample sub-group varied from a very high 78.3% (Choir) down to 15.6% (Economists). Rates of between 41% and just over 52% were achieved with the large and potentially analytically most important biotechnology, farmer and forester sub-groups. Given the complex and demanding nature of the questionnaire and the inability in almost all cases to follow up and prompt respondents to return it, overall this was considered a better than satisfactory response.

Group	Organisation (confidential)	Date	Notes	No. sent	Valid returns	Return %
Conservationists	Nature 'Quango'	7/97	Distributed via internal mail by Personnel Officer, collected there & posted back	60	18	30
Radical environmentalists	(UK) Earth First! national gathering	7/97	Handed out by author at annual gathering	80	24	30
Engineers	Defence electronics contractor	9/97	Handed out internally & returned by hand	30	7	23.3
International students	VUB (Free University Of Brussels) field trip to Scotland	4/98	Handed out & collected by author on field trip	35	23	65.7
Choir	'Voice House', Edinburgh	1/98	Handed out & collected personally by author at choir rehearsals or by post	60	47	78.3
Farmers	National Union of Farmers Scotland, Lothians Office membership list	8/01	Script with cover letter posted to named individuals (every third on list)	150	62	41.3
Foresters	Institute of Chartered Foresters (UK)	5/01	Posted scripts with cover letter & SAE to UK members, surnames beginning S	109	57	52.3
Biotechnologists	Independent biotechnology research institute staff	10/01	Sent scripts for distribution via internal mail by Director's PA, collected internally	90	39	43.3
Economists	Undergraduate year 2 economics class, University of Edinburgh	11/01	Author asked for help verbally, handed out scripts at morning lecture. Returned by internal mail	45	7	15.6
Environmental graduate school	Centre for Human Ecology, Edinburgh	97-00	Personally by hand	41	10	24.4
Total				700	294	42

Table 5.2: Questionnaire distribution and response rates

Distribution and return rates were as follows:

Return rate > Delivery method	Scripts distributed % (no.)	Distributed scripts returned % (no.)	Relative return rate
Post	37 (259)	45.9 (119)	1.09
By hand	37.3 (261)	42.5 (111)	1.01
Internal mail	25.7 (180)	35.6 (64)	0.85
Overall	100 (700)	42 (294)	1.00

Table 5.3: Questionnaire distribution and return rates

5.2.1.3 Sample demographics

As would be expected given the way in which sample sub-groups were selected, often deliberately to oversample groups rare in the population at large (e.g. farmers), demographics of the various sample sub-groups reveal biased distributions. For age and sex:

- The student and student-like groups (Economists, International Students and Ecoradicals) are all young, with a mean age under 30, with the International Students being somewhat female;
- Farmers have a mean age in their mid-fifties and are heavily male;
- Foresters are heavily male;
- Choir are very heavily middle-aged females;
- Biotechnologists and Nature Quango groups are somewhat female.

Overall, younger females and older males predominate – due to farmers and foresters being mainly old and male, and choir members, international students and ecoradicals being mainly female. The sample is also biased toward the Managerial/Technical (middle) class, with less than one in ten in the lower 3 Social Class groupings and an over-representation of Professionals, placing a question mark over any conclusions regarding the population as a whole and about the lower class groupings in particular.

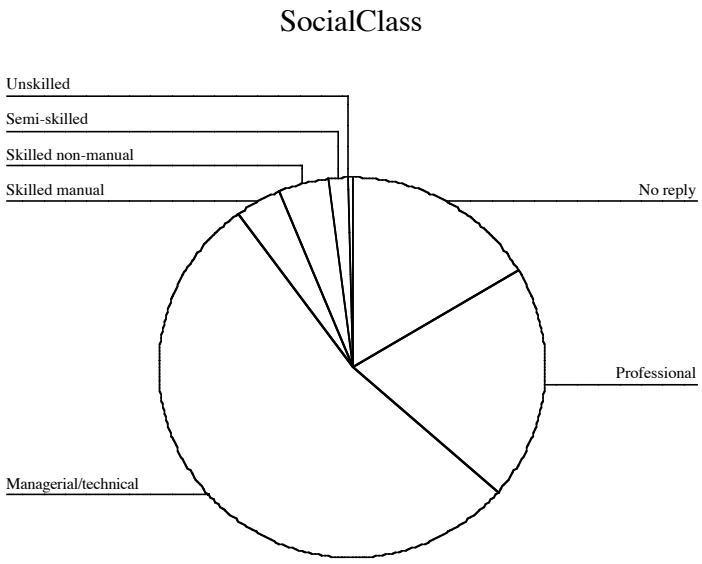


Figure 5.1: Social class distribution of sample

The whole sample is much more highly educated than the population at large: 73.5% to at least degree standard. It is therefore unrepresentative of the general population although is probably more representative of the (mostly) professional groups surveyed.

As a result of the deliberate oversampling of rural residents, including farmers and (in all expectation) foresters, only one third of the sample is city dwellers. The remainder is relatively evenly distributed among the four other possible habitations (and each type of habitation contains at least 13%, or one in 8, of respondents), which strengthens the potential validity of comparisons about residents from outside cities.

	Valid Percent
City	36.1
Town	16.5
Village	14.1
Country not farm	13.1
Farm	20.3
Total	100.0

Table 5.4: Distribution of residence

None of these results – barring the education level - were unexpected, but each should serve as notice for caution about the wider applicability of any conclusions based on this sample alone.

5.2.2 Materials

In this section we will outline in detail the data required to make it possible to test the model and detail how the test instrument was compiled to produce this data.

Having surveyed the possible methods of gathering the required data and the nature of the information required, it seemed that a largely structured questionnaire with some semi-structured elements was the most appropriate instrument. However, whilst many of the component parts of such a questionnaire could be culled from previous research, it was clear that for the purposes of this project, it would be necessary to design certain original instruments in order to fulfill its unique information needs.

The resulting questionnaire, incorporating several validated instruments and other original elements was, given the considerable data requirements, as compact as possible, but nonetheless unusually lengthy (28, A5 sides, bound). It is believed that many of the worst sources of potential error were ironed out in subjecting it to lengthy and rigorous testing described below. Indeed in retrospect it seems clear from participant feedback that the time and effort invested at this stage paid off with a questionnaire that is sufficiently clear and logical in its progression to have stimulated positive comment from some participants.

The questionnaire was prepared as a means of gathering data to test the various relationships proposed in the model (see Questions Arising, above) and the resultant hypotheses. Given the particular requirements of this survey and with a sense gleaned from the Literature Review of the variables that previous authors have successfully included, the model was redrawn as a set of relationships between variables, as shown in Figure 5.2.

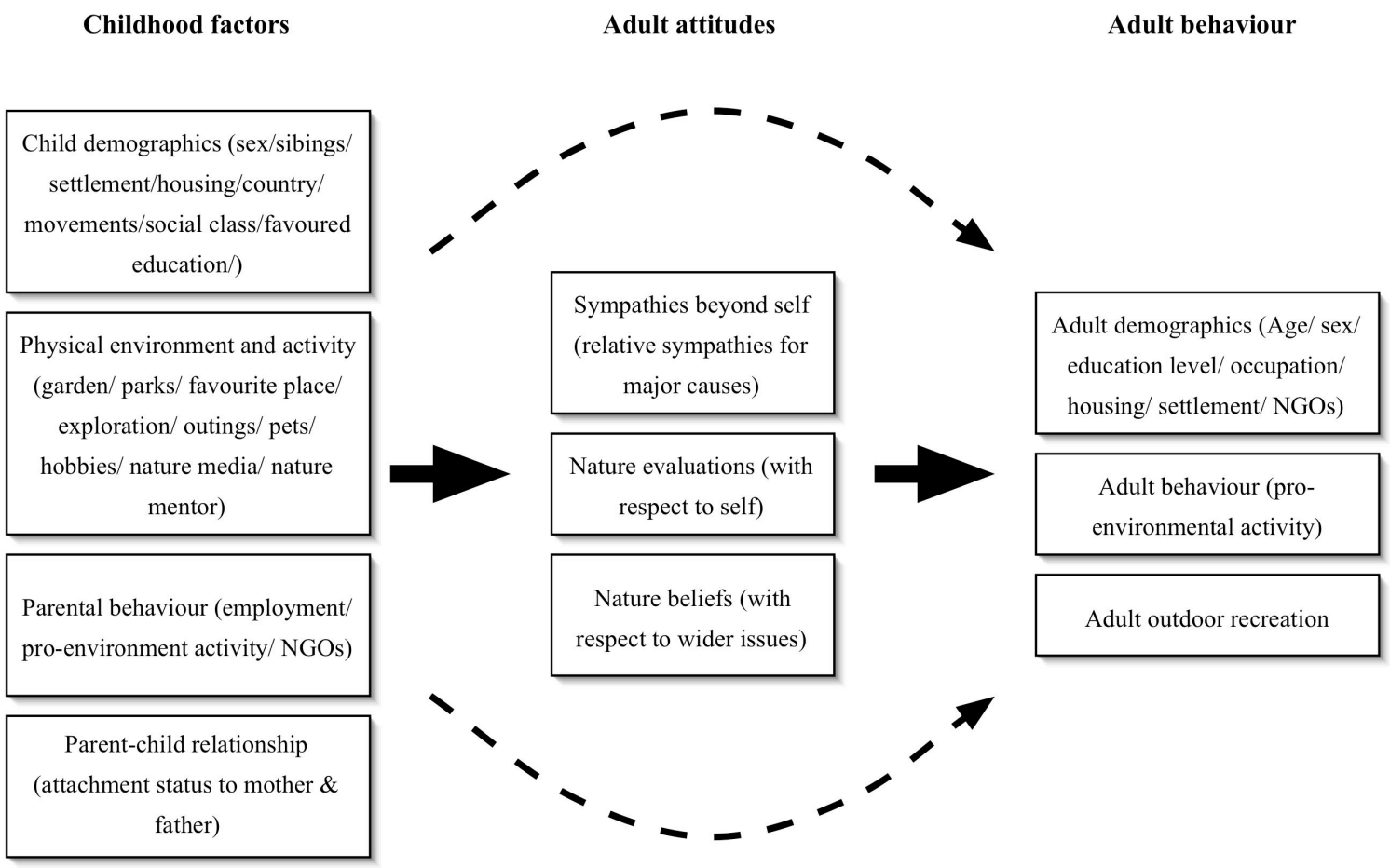


Figure 5.2: Model for variables in the Questionnaire

5.2.2.1 Full list of variables

As detailed below, this model was then converted into a number of questionnaire sections dealing with the various areas of enquiry in turn. In each case, pre-existing instruments were considered, where known, for their applicability in this case. As a result, some sections merely employed available, validated instruments whereas others were created afresh. This process led to a questionnaire instrument that measured a wide variety of variables: these were termed 'Simple' variables. A further series of variables was created as a result of a series of mathematical transformations of certain of these variables, most often in the form of scale scores or principal components analyses to produce factor scores: these were termed 'Derived' variables. Finally, as detailed in Table 5.5: Full List of Simple and Derived Variables, a number of combinations of these variables were computed to produce 'Compound' variables.

Type of Variable		Simple (Questionnaire) Variable	Derived Variable
Childhood Factors	Child Demographics	Sex; Siblings (Male, Female); Sibling Position; Settlement Size; Settlement Description; Housing Type; Country; Movements; Garden; Park/Woods; Pet Presence; Which Pet Types; Mammal Types; Non-mammal Types; TV; Nature Mentor; Which Mentor; Mentor Feelings; Father Occupation; Mother Occupation; Mother At Home	'Urban/Rural; 'Childhood Surroundings'; Social Class; 'Rich/Poor World'
	Child Behaviour	Favourite School Subjects; Play; Favourite Place; Favourite Place Description; Favourite Place Feelings;	Nature Hobby Category;

		Wander; Wander Feelings; Trips; Trip Feelings; Nature Hobbies; Nature Hobby Frequency; Favourite Hobby; Nature Reading; Reading Frequency; Nature Media Frequency; Why Nature Media	
	Parental Behaviour	Parental NGO Members; Parental NGOs; Parental Ecoactivity overall	Factors: 'Ecopractical'; 'Ecopolitical'
	Attachment Status	Paternal Care/Overprotection; Maternal Care/Overprotection	Paternal Attachment Classification; Maternal Attachment Classification
Adult Attitudes	Relative Sympathies	Human (Overall, Local, Global); Animal; Environmental	Sympathy Category (of 3 & of 4); Factors: 'Environmental Sympathy'; 'Animal Sympathy'; 'Human Sympathy'
	Nature (Eco)Evaluations	Ecoevaluation Category	Factors: 'Anthropocentric'; 'Technocentric'; 'Conservationist'; 'Ecocentric'
	Nature (Eco)Emotionality	Ecoemotionality Category	Factors: 'Secure'; 'Fearful'; 'Dismissive'; 'Stoic'
Adult Behaviour	Adult Demographics	Age; Settlement Size; Settlement Description; Occupation; Education Level; Tertiary Subject; Sample Sub-group	Social Class
	Adult Behaviour	Adult Ecoactivity overall	Factors: 'Ecopractical'; 'Ecopolitical'; 'Ecotransport'
	Outdoorsiness	Outdoorsiness overall	Factors: 'At Ease'; 'Loner'; 'Utilitarian'; 'Pragmatist'

Table 5.5: Full List of Simple and Derived Variables

A further series of 'Compound' variables of use in later analyses was created by combining existing variables as follows:

Compound variable	Components	Coding scheme
'Townie'	Urban/Rural + Childhood Surroundings	Urban-grey/ urban-green/ rural-green/ rural-grey[4]
'Nature Home'	Garden + Pets	Garden-no pets/ garden-pets/ no garden-pets/ no garden-no pets[4]
'Menagerie'	Siblings + Pets	Alone/ one or less pet-sib/ two or more pet-sib/ three or more pet-sib[5]
'Nature Mediation'	Nature Mentor + Country Trips	Mentor rare trips/ mentor some trips/ mentor often trips/ no mentor rare trips/ no mentors some trips/ no mentor often trips
'Ecoparenting'	Nature Mediation + parental Nature Media encouragement	Neither/ encourage/ mentor/ both[6]
'Explorer'	ParkPlay + Wander	Stay at home/ play never wander/ play rarely wander/ play some wander/ play often wander/ wander not play
'Free Range Child'	Explorer + Favourite Place	Battery child/ free range child[7]
'Nature Child' / 'Nature Child Score'	Garden + Pets + Hobby	Both + hobby/ both no hobby/ garden + hobby/ garden no hobby/ pet + hobby/ pet no hobby/ neither + hobby/ neither no hobby (Nature Child Score = none/ one/ two/ three elements)

Table 5.6: List of Compound Variables and Coding Schemes

[4] A "2 x 2" matrix.

[5] The goal of this variable was to capture the degree of human-animal interaction. Children with neither siblings nor pets were coded as one group (1); no siblings or no pets or only one of each in a second group (2); three siblings and/or pets a third (3); four siblings and/or pets a fourth (4); five or more siblings or pets a fifth (5).

[6] 'Neither' = reasons for watching nature media do not mention parents' encouragement + no nature mentor; 'Encourage' = reasons for watching nature media mention parents' encouragement + no nature mentor; 'Mentor' = no parents' encouragement + nature mentor; 'Both' = parents' encouragement + nature mentor.

[7] 'Free range' = in the most active three categories in 'Explorer' (i.e. Play Some Wander, Play Often Wander and Wander not Play) and favourite childhood place away from home (Question 2.10 recode 2). By contrast, subjects who fell within the least active three categories in the Explorer variable (i.e. Stay at Home, Play Never Wander and Play Rarely Wander) and whose favourite childhood place was near home are termed 'Battery Children'.

5.2.2.2 Development of the questionnaire

The questionnaire consisted of 7 sections:

- Section 1: (current) demographics
- Section 2: childhood environmental activity (including child demographics)
- Section 3: parental work and environmental actions
- Section 4: charitable giving (relative sympathies)
- Section 5; present environmental activities and actions
- Section 6: attachment status to mother and father
- Section 7: environmental beliefs and evaluations

The order in which the sections were presented came about as a result of repeated pilot versions and respondent feedback, and in particular a consideration to make the earlier part of the questionnaire more plainly factual to intrigue and interest, moving progressively to more personally challenging questions once the respondent was committed to filling it in.

5.2.2.2.1 Section 1: demographics

Section 1 sought information on basic demographic factors such as age, gender, final level and subject of education and favourite school subjects, occupation (also used as a proxy for social class), presence of siblings and birth order position. Standard demographic questions on sibling numbers and position, education level and subject choice, occupation, age and sex were included.

Throughout this study 'childhood' has been referred to without having stated exactly what period it encompasses since, among other things, different authors seem to mean different things. For the purposes of this study, however, an age must be chosen not least so that subjects' can be instructed to try to recall experiences within a common time frame. A choice has therefore been made that childhood will be treated as up to and including age 12, on the grounds that a common definition of a child is a pre-adolescent, but also conscious that this is to some extent developmentally arbitrary.

Whilst this section was an original construction the only slightly non-standard items concern place of habitation (Q1.1) and the size of the settlement (Q1.2). These two questions

on current residential type (city, town, village, farm and countryside apart from a farm) and settlement size (<500, <5,000, <50,000, <500,000 and >500,001) were created with the aims of distinguishing urban from rural from farming childhoods, and of elucidating the potentially different perspectives of objective settlement size and subjective perception of the size character of the settlement. A proxy birth order position question (Q1.3) was included, broken down only to youngest/oldest/middle/only child.

Educational attainment levels (Q1.6) are characterized in dual Scottish/English style to make the questionnaire maximally comprehensible to all British-schooled respondents. It was decided to give an open choice of University subject, favourite school subject(s) and occupation as more codified questions would have consumed too much space and respondent attention, and since classifications are available for all of these (although this creates more work in coding).

5.2.2.2.2 Section 2: childhood habitation/activities

Additional original demographic factual questions in this section were country of childhood (Q2.1), number of homes before age 12 (Q2.2), housing type (Q2.5), presence of garden (Q2.6), nearby nature (Q2.7), pets (Q2.18), pet types (Q2.19), and presence of television (Q2.24) each suggested by a wide reading of the literature as potentially salient.

Questions potentially open to more subjective answers were on frequency of playing in nearby nature (Q2.8), wandering more than 20 minutes from home (2.12) (proxy for approximately 1 km, a distance greater than the mean stimulated recall of 11 year olds (Matthews 1985)), trips to the country (Q2.14), to the city (Q2.16), having had a favourite place (Q2.9) and describing it (Q2.10), having had nature hobbies (Q2.20), the favourite (Q2.22) and their frequency (Q2.21), reading about (Q2.23) and watching or listening to media about nature (Q2.25), having had an adult nature 'mentor' (Q2.27) and their relationship (Q2.28), and feelings about the favourite place (Q2.11), wandering (Q2.13), country trips (Q2.15), city trips (Q2.17), nature media (Q2.26), and the nature mentor (Q2.29). In all cases of frequencies, the simple colloquial four-element never-rarely-sometimes-often scale was employed for ease of understanding, and for feelings about trips the four-element scale hated-disliked-liked-loved was adopted.

Given the relative immobility and confinement of pre-school infants and the inaccessibility to the detail of these interactions when asking adults two and more decades later, it was judged a valid next-best approximation to use as a proxy variable for nature contact in the first five or so years of life the presence or absence of a garden and/or pets.

A more detailed pet relationship picture could have been obtained with the Companion Animal Bonding Scale (Poresky, Hendrix et al. 1987) or the Pet Bonding Scale (Angle, Blumentritt, & Swank, 1993). However, since extensive work in the area of pet-human relationships reliably indicates a relationship between having pets and a range of relevant factors, it was judged sufficient on the grounds of brevity to simplify to merely asking if pets were present in childhood and, if so, which. It was decided that since the critical factors are the ownership of pets and where they sit on the objective (and childhood subjective) phylogenetic tree, identified by the animal species, two questions on these aspects would be sufficient. The choice of identified pets was drawn up to include all major childhood pet groups (Paul and Serpell 1993).

The questions on nature hobbies, their frequency and which was favourite were included to illustrate the frequency and character of unmediated nature contact. By contrast, the questions on reading and broadcast media were included to characterize the extent of mediated nature contact, and to enable the possibility of examining the correlation between mediated and unmediated nature contact.

Questions on a 'nature mentor' were included as previous work suggested that such figures could play a significant role in modulating the child's degree and quality of contact with nature (Palmer 1993), and as the extensive literature on environmental education virtually takes as given that teachers can play this role. However the literature is vague on this point and unclear about why teachers, who may spend much time with the child but at a later stage than numerous other adults or older children, and mostly in the classroom, might be significant. The author's suspicion is that whilst teachers may moderate the child's relationship with nature, people with whom the child has had earlier and closer relationships, and the emotional character of those relationships, may be more important. Hence three questions on the remembered presence of a mentor, the relationship status of the mentor to the child, and an open question requesting description of the affective character of this relationship.

5.2.2.2.3 Section 3: parental work and environmental actions

This section sought information on parental occupations, mother's work pattern, parental environmental group membership and environmental actions. The environmental actions section merits some detail.

Validated scales measuring environmental concern and general involvement in conservation issues were reviewed, the requirement being that they could be both recalled by

adult subjects in respect of their parents, and also used (in Section 5) about their own actions (Maloney and Ward 1973; Maloney, Ward et al. 1975; Schahn and Holzer 1990; Weigel and Weigel 1978). Typically these scales cover perceptions or knowledge of environmental problems, level of concern about environmental issues (e.g. pollution, waste disposal), conservation actions people would be prepared to undertake, conservation actions actually undertaken, and emotional responses to environmental problems. By way of comparison, a more recent formulation of such an instrument asks if subjects (Steel 2000):

- Avoid Pesticides
- Avoid Aerosol Cans
- Avoid Foam Containers
- Avoid Paper Products
- Use Recycled Paper
- Composting
- Buy Environmentally Sound Products
- Reduce Water Usage
- Reduce Energy Consumption

However no existing instrument appeared ideal by itself and most missed the overt political dimension of environmentalism. Therefore a further instrument to measure these dimensions was sought. Measures of political participation in environmental issues are often based on the classic study *Political Action* (Barnes and Kaase 1979). The possibilities it suggested were:

- Political activity
- Signing petitions
- Donating money to an environmental group
- Joining an environmental group
- Writing letters to local, state or federal legislators or agency officials
- Writing letters to newspapers

- Soliciting signatures for a petition
- Phoning or personally lobbying legislators or agency officials
- Campaigning for a candidate
- Attending public meetings
- Participating in lawful demonstrations
- Civil disobedience

The most statistically significant of these were donating money, demonstrating and contacting politicians. Following Bray (1996) these were therefore combined with the 7 most pertinent environmental concern items to form a revised joint environmental behaviour instrument.

When measuring self-report rather than observed factors like these on environmental behaviours and activism it is important to be mindful of the potential for socially desirable responses, which may lead to overestimation of actual behavior (and in the case of the subject reporting their parents' behaviours, over-or under-estimation). In addition, respondents or their parents may have indulged in each named activity only once or regularly, so the overall index can only be regarded as a relatively loose indicator of pro-environmental activity.

5.2.2.2.4 Section 4: charitable giving

Section 4 is a verbatim re-use of the 'Charity Donations Test', an instrument created by Paul (1992). Its first published use, in measuring relative sympathies to animals (Paul and Serpell 1993), showed a strong positive correlation between animal giving and number of pets in childhood, and a negative correlation with human giving. The exercise is both an absolute measurement (respondent honesty permitting) of the appeal of different popular human, animal and environmental concerns and a relative measure pitting them against one another, and it was for this latter quality that it was employed on this occasion.

5.2.2.2.5 Section 5, first half: present environmental activities

This instrument was a revised version of the one used by Bray (1996), following a review of the literature which did not unearth a more appropriate existing one. The sixteen items

chosen identified a series of the most common activities that bring one into contact with nature directly or vicariously, and asked the respondent how often he or she participated in each activity. Items were chosen to reflect a gradation from obligatory contact with nature (e.g. 'because of my job') to habitual everyday (e.g. 'to walk a pet') on through necessary-for-hobbies (e.g. 'shooting'; 'gardening') and finally deliberate contact seeking (e.g. 'visit wild areas'; 'study plants'; 'stay out overnight'). Further items were included to distinguish between solitary and accompanied nature contact; vicarious contact (e.g. 'watch nature programmes') and, finally; motorised and non-motorised outdoor sports. It was hoped that this range of options would help distinguish between people who were actively interested in nature for its own sake, and those who were not. The response scale of 'Never-hardly ever-every year-every month-every week-every day' scale was chosen for maximum comprehension and speed of completion.

5.2.2.2.6 Section 5, second half: present environmental actions

Apart from the rewording necessary to address the questions to the respondent, this section was identical to the analogous part of Section 3. Questions 5.27 and 5.28 were the same as Questions 3.4 and 3.5, asked in respect of respondents.

5.2.2.2.7 Section 6: adult attachment

Why measure attachment status? The requirement in this instance is for a means to measure the preverbal, security-seeking quality of the relationship between the child and each of their parents, under the assumption that this may be reflected in other relationships. As probably the most thoroughly examined phenomenon of parent-child relationship quality, the theory of attachment, with its strong suggestion of lasting and broad effects on personality and life events, appears to be a highly appropriate framework for the present study. Hence a review of available attachment instruments was conducted.

The most significant and widely acknowledged measurement of attachment status is the Strange Situation procedure (Ainsworth, Blehar et al. 1978), which involves direct observation of infant-mother behaviour in a laboratory situation. Because of its cumbersome nature, there has been a move toward increasingly brief questionnaires to complement and in some cases substitute in a less labour-intensive and time-consuming way for the standard behavioural measures. Condon and Corkindale (1998) for instance focused on the mother's subjective experiences of her infant in creating their 19 item self-report questionnaire which provides acceptable levels of internal consistency and test-retest reliability. Four factors

(pleasure in proximity, acceptance, tolerance, and competence as parent) account for approximately 40% of the variance. However the criterion validity of the instrument has yet to be established by comparison with behavioural measures.

There appears to be no analogous 'adult strange situation' procedure for the assessment of adult attachment status, which is an interesting omission from the body of research, particularly given the foundational nature of the infant behavioural test. However adult questionnaire instruments have been developed. The benchmark instrument is the Adult Attachment Interview (AAI) (George, Kaplan et al. 1984/1985/1996), a widely utilized, robust and reliable instrument with a decade and more of clinical application. It is administered face-to-face by trained interviewers and takes a considerable time for each subject. Options for self-report attachment instruments included:

- Parental Bonding Instrument (Parker, Tupling et al. 1979).
- Reciprocal and Avoidant Attachment Questionnaires (West, Sheldon et al. 1987; West and Sheldon-Keller 1994).
- Relationship Questionnaire (Bartholomew and Horowitz 1991; Hazan and Shaver 1987).
- Relationship Styles Questionnaire (Griffin and Bartholomew 1994).
- Expressions of Close Relationship Scale (Bartholomew and Shaver 1998; Brennan, K.A., Clark et al. 1998).

Despite differing in terms of domain (family, peer, or romantic relationships), method (interview, Q-Sort, or self-report), dimensionality (categories, prototype ratings, or dimensions), and categorization systems, these measures are in general strongly convergent with each other and the benchmark AAI (Bartholomew and Shaver 1998; Manassis, Owens et al. 1999; Sperling, Foelsch et al. 1996; West, Spreng et al. 1998), and the choice can be based on practicality. The instrument chosen must be one that can be completed briefly by unsupervised adults with no prior knowledge, yet which produces relevant information about their experience as children. The construction of a tailored instrument was briefly considered but, given the likely magnitude of the task and the availability of existing potentially applicable instruments, was deemed unnecessary.

The Reciprocal and Avoidant Attachment Questionnaires were deemed to require too much amendment. The Relationship Questionnaire does not apply specifically to parental

relationships, the Relationship Styles Questionnaire is aimed at romantic relationships, and the Expressions of Close Relationship Scale focuses on partner relationships. The Parental Bonding Instrument (PBI) appears appropriate. Whilst there does not appear to be a great deal of published research on its use, what there is reinforces its validity and applicability to the circumstances of this investigation (Arrindell, Gerlsma et al. 1998; Chambers, Power et al. 2000; Klimidis, Minas et al. 1992a, b; Manassis, Owens et al. 1999; Murphy, Brewin et al. 1997) and it was therefore chosen.

The PBI is a 4-point, 25-item Likert-style scale used to measure dimensions of parent-child bonding entitled 'care' and 'overprotection' (see Figure 5.3). Adult respondents answer the questions as they relate to their biological parents or parent figures as remembered from their first 16 years. Twelve of the items relate to care and 13 relate to protection of the child by the parent. It has a response reliability of 0.704 (p <0.001) in a 48-item version and test-retest correlation of 0.761 (p<0.001) for the 'care' scale and 0.628 (p<0.001) for the 'overprotection' scale and both scales have high split-half reliability. It takes 2-5 minutes to complete (Parker, Tupling et al. 1979).

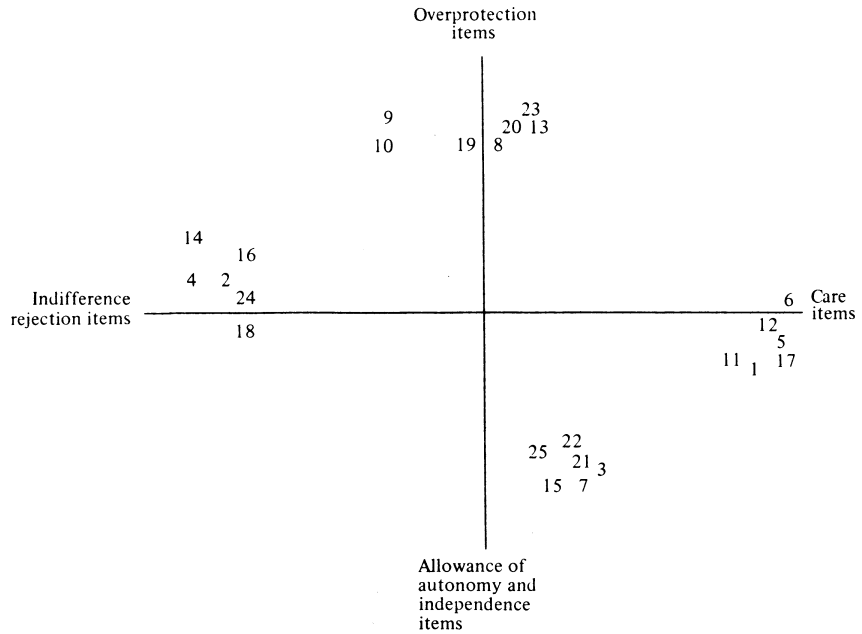


Figure 1. Plot of the rotated factors for both parents.

Source: Parker, G. et al (1979), p4.

Figure 5.3: Item dimensions plot for Parental Bonding Index

The PBI has been applied widely in a variety of cultures and languages and is considered applicable to samples in Spain (Gomez-Beneyto, Pedros et al. 1993), France (Mohr, Preisig et al. 1999), Italy (Scinto, Marinangeli et al. 1999), China (Bih-Ching, Wen-Juo et al. 1999) and Japan (Sato, Narita et al. 1999). It has also usefully been applied to non-normative

populations including incarcerated young offenders in Scotland (Chambers, Power et al. 2000) and to schizophrenics (Favaretto, Torresani et al. 2001).

There is some debate in the literature over whether the PBI is best used as a two- or three-factor measure. Whilst maintaining that the PBI is in practical terms best used to measure two factors, Parker et al point out that the correlation between their measurements of the care and overprotection scales is –0.238 ($p<0.001$), suggesting that the scores on the two dimensions are not entirely independent and require orthogonal correction in use. Some recent authors have maintained that a three-factor solution is more appropriate. Murphy's analysis distinguished between three factors of care, denial of psychological autonomy and encouragement of behavioural freedom (Murphy, Brewin et al. 1997), and Cox claims confirmation for this argument (Cox, Enns et al. 2000). However this evidence was published after the present questionnaire was created and has thus been excluded from the enquiry. It may be legitimate to reanalyze the present dataset in this light at a later date.

Given the disjunction between the relatively impersonal nature of the rest of the final questionnaire and this instrument, it was felt there was a significant likelihood of an unusually high neutral or middle-point effect, so a 4-point Likert scale was chosen to force respondents into a choice on each item.

5.2.2.2.8 Section 7: environmental attitudes

Numerous studies have attempted to assess environmental attitudes and behaviours (e.g. Maloney and Ward 1973; Maloney, Ward et al. 1975; Schahn and Holzer 1990; Weigel and Newman 1976; Weigel and Weigel 1978). Characteristically they cover perceptions or knowledge of problems, concern over environmental issues, espoused and actual conservation actions and, more unusually, emotional responses to problems. One of the earliest sets of instruments was derived to assess verbal commitment (VC), actual commitment (AC), emotionality /affect (A) and knowledge (K) to ecological issues from an initial pool of 500 questions. The most significant subscale intercorrelation was that scale K did not correlate significantly with any of the other scales, whereas there were moderately higher correlations between all the other subscales (Maloney and Ward 1973). The authors concluded:

> *'In colloquial terms, most people say they are willing to do a great deal to help curb pollution problems and are fairly emotional about it, but, in fact, they actually do fairly little and know even less.'*

However other studies have found that a majority claim to have changed their behaviour for environmental reasons, and believe that lack of environmental education was a major problem (NSW Environmental Protection Authority 1994).

Dunlap established a relationship between environmental attitudes and behaviour, and belief in 'traditional' American beliefs and values (e.g. progress, abundance and individualism) (Dunlap and Van Liere 1978; Dunlap, Van Liere et al. 2000). This 'Dominant Social Paradigm' was conceived of as in opposition to the 'environmental paradigm,' for which the 'New Environmental Paradigm Scale' (NEP) was constructed. As one of the most reliable environmental attitude scales (Tarrant and Cordell 1997) it became the most widely used. The name of the instrument is perhaps unfortunate, implying that such values are novel, when in fact there is a striking resonance with the values of native peoples globally, and Western cultures historically (Grove 1992p42).

Used to show that environmental attitudes are not particularly good predictors of pro-environment behaviours (Theodori, Luloff et al. 1998), its unidimensionality has been challenged: a number of US National Park Service studies found two dimensions, although it was conceded that park visitors would likely support a more ecological view (Noe and Snow 1990). Another analysis suggests three dimensions: the balance of nature; limits to growth; and man over nature (Albrecht, Bultena et al. 1982), although a reanalysis of both this and the original author's data was unable to confirm either result without reducing the scale to nine items (Geller and Lasley 1985). Further revisions reduced to six the number of questions *required* for a reliability coefficient (Cronbach's Alpha) of .82, agreement on the first three and disagreement on the last three scoring highest:

- The balance of nature is very delicate and easily upset by human activities;
- The earth is like a spaceship with only limited room and resources;
- Plants and animals do not exist primarily for human use;
- Modifying the environment for human use seldom causes serious problems;
- There are no limits to growth for nations like the United States;
- Humankind was created to rule over the rest of nature.

Gray (1985) questions ‘whether any measure of environmental paradigms can be unidimensional’ and asserts that ‘beliefs in such a complex domain as ecology are not likely to be simple...but complex and multidimensional.’

An evident bias of the NEP and similar instruments is their somewhat catch-all use of the term ‘attitudes’ to capture what are in fact opinions or expressed beliefs about public environmental issues. Whilst there must of course be a relationship between such socio-political concerns and more personal experience, the individual’s relationship with nature is not necessarily entirely captured by description at this level, which tends to neglect the affective dimension of knowledge. Although people's values about nature predict environmentalism (Oskamp 1977), comparatively few studies examine such emotional responses to nature.

Numerous authors have proposed dimensions along which an individual’s attitudes to nature might be placed: instrumentalists versus spiritualists; utilitarian versus moral consideration to non-humans elements of the universe; egoistic and social-altruistic versus biospheric; and technocentrism-anthropocentrism-ecocentrism (O'Riordan 1977; Thompson and Barton 1994)).

The terminology of ‘ecocentrism’ and ‘technocentrism’ originates with O’Riordan: ecocentrists view ecology as being of prime importance; technocentrics see science and technology as being central. For ecocentrists, nature exists for its own sake: human extinction would not remove meaning from the continued existence of other life (Pepper, Perkins et al. 1984). Both animate and inanimate nature has rights, and human values which undermine nature’s intrinsic values must be abandoned or modified (Oelschlaeger 1991). The fates of humans and nature are irredeemably physically and psychological interdependent (Partridge 1984). ‘Radical ecocentrists’, often termed deep ecologists, go further suggesting that since humans are threatening the richness and diversity of life, a decrease in human population is desirable for the greater ecocentric good; that requires fundamental changes in economic, technologic and cultural ideology (Oelschlaeger 1991).

Conservationists, or ‘anthropocentric nature-lovers’, share an holistic view of nature with ecocentrists: the whole is greater than the sum of the parts. All elements of an ecosystem are critical to its healthy functioning, and maintaining this through, for example, wilderness will bring benefit to future generations. Nature is valued primarily in terms of human utility, including non-material values such as aesthetics and morality.

Anthropocentrists consider humanity to be central, appraising all else from this standpoint. Oelschlaeger prefers ‘preservationist’ since, he maintains, anthropocentrism is

not necessarily in conflict with nature (nature preservation being psychologically and materially beneficial to humans).

Technocentrics believe nature to be inert matter and energy governed by rational laws and available for humans to transform at will. Progress is measured by economic growth and technological advance, and objective science can solve environmental problems which may be an inevitable price of development, but are better borne than abandoning modernity which would involve a descent into primitivism (Pepper, Perkins et al. 1984). Environmental decisions are best left to scientific and economic experts; political or public involvement in environmental decision-making is neither necessary nor desirable (O'Riordan 1977).

The continuum appears as follows:

Technocentric - Anthropocentric - Conservationist - Ecocentric

Thompson and Barton (1994) looked at the relationship between ecocentric, anthropocentric and apathetic attitudes to nature as motives for self-reported conserving behaviours and for belonging to environmental organisations. Example (not used) items from their 33-item scale include 'I prefer wildlife to zoos', and 'Sometimes when I'm unhappy I find comfort in nature.' It was found that ecocentric and anthropocentric scales independently predicted conserving behaviour and belonging to environmental organisations in a general population sample.

In light of these two differing but seemingly not coincident approaches it was decided to include instruments reflecting each (evaluations and affect) as it was likely they would provide complementary perspectives. For the former, a 12-item variant of the NEP was constructed, following Bray's (1996) recent local experience testing with a Scottish population. For the latter, a 12-item variant of Thompson and Barton's (1994) instrument was constructed, including only the more directly personal, emotion-referencing items and synthesising complementary ones.

Respondents to both instruments were asked to agree or disagree with a series of statements. All response scales used were 4-point (*Strongly Disagree-Disagree-Agree-Strongly Agree)* Likert scales for the sake of uniformity (with other four-point scales elsewhere in the questionnaire), comprehensibility, disambiguation and speed. Questions were alternated such that a respondent answering consistently from one perspective would not be able to agree (or disagree) with every single question. With each instrument a considerable number of minor amendments were made consistent with removal of

ambiguity, repetition, cultural inapplicability, verbosity, and high reading age (where no sense was lost).

5.2.3 Procedures

The way in which the questionnaire was tested and revised before use, how the data was turned into computerised form, and how the data was recoded ready for analysis (including a full explanation of how each of the final variables was obtained from the raw data) will now be described

5.2.3.1 Piloting

A series of 8 cycles of revision and feedback were carried out in order to ensure that the questionnaire had optimised the likelihood of users finding it interesting, and being motivated to complete and return it[8]. Initial versions were printed and presented on single-side stapled A4 paper and feedback sought from experienced colleagues initially on content but as that became settled, progressively on form. Less forewarned and informed individuals were recruited as informal trial respondents in each cycle of revision, including:

- Colleagues and researchers in the Psychology Department;
- Colleagues with an interest in the subject matter;
- Postgraduate students interested in ecopsychology;
- Undergraduate students;
- Friends and family.

There was a very useful set of responses to the content of the questionnaire from these differing perspectives, much of which may otherwise have escaped the author. Many changes made included rephrases of the framing commentary, question wording and question order, and section order. Some notable points include:

[8] Details of the changes made in pilot questionnaire instruments between versions are retained on file by the author, as are full copies of all versions used in development. The public (1997) version was revision 8; version 9 (2000) was issued to correct a few minor typographical errors.

- Addition of a 'friendly' introduction and closing statement style including reassurance about anonymity;
- Keep the amount of prior information to digest as modest as necessary to entice participation;
- Start with factual, easy questions requiring little thought or internal reflection;
- Move on to questions requiring historical reflection and some indirect emotional content;
- Build to direct, personal, emotion and opinion-based (evaluative) questions, so as to leave the subject (who completes the questionnaire in the assigned order) gently through it.
- Encourage completion of questions even where doubts exist, and the addition of written commentary where the participant feels it appropriate;
- Inclusion of a space at the end for comments;
- An opt-in ability to volunteer for later research involving interviews, with a promise to send a summary of the completed research to all who gave their address.

In particular, the authors' concerns about the emotional depth of the PBI were borne out, seen for instance as a 'sudden intrusion' by some, particularly when there was no forewarning; it therefore required some careful introductory wording to prepare the participant. The PBI answer phrasing was misread and misunderstood by some pilot respondents, so the wording was changed from:

'Very like' to *'Very like this'*

'Moderately like' to *'A bit like this'*

'Moderately unlike' to *'A bit unlike this'*

'Very unlike' to *'Very unlike this'*

The PBI answer order was judged to have potential to discourage negative answers, so the order was reversed, going from:

Very like > Very unlike to Very unlike this > Very like this

The feedback on the form of the questionnaire, in addition to a variety of personal advice, examination of previous example questionnaires and a rapid review of best practice was as follows:

- Typeface: a serif typeface (Times, Apple system version) was used throughout as it has been shown that serifs increase legibility and reading speed, especially when dealing with small type or giving less than full attention.
- Symbolism of the University crest (as opposed to anonymity of source or verbal naming alone): – carries prestige and authority that suggests the research is legitimate and important.
- Colour: Non-standard colours gain greater attention in the first place. They are not as easy to 'lose' in a pile of normal white paper. And they carry a subtly more demanding connotation of wanting to be completed. Similar logic was employed for the use of the non-standard recycled green envelopes.
- Pre-paid and addressed reply envelopes: pre-addressed envelopes, either for internal or external mailing, are known in market research to gain a greater response rate as they make the act of mailing the completed questionnaire ready for return slightly less time-consuming. Also, pre-stamped envelopes for external mailing carry the obvious connotation that prior expenditure has been incurred by the experimenter, placing a subtle obligation on the respondent to take the item seriously.
- Bookletting: people tend to respond better (higher acceptance and completion rates) to folded and saddle-stapled booklets rather than corner-stapled questionnaires.
- Size: A4 size is often used in questionnaires. However alternative versions in the half-size and more unusual A5 produced reactions that this was a more portable, aesthetically satisfying package in the hand that could be left folded open at the page the person had got to. It also made it possible to send it in A5 envelopes giving an impression of professionalism.

In particular, a good deal of time was spent in the design stage desk-top publishing the questionnaire such that it was visually appealing and highly functional, a process in which the author's professional print design experience aided considerably. Users preferred a layout using sequences of similar-formatted questions in a left-side column with answers on the right, rather than an answer space beneath each question.

Bearing in mind the need to reorganise it for reproduction in the order seen by respondents, sideways bound into an A4 book, the entire final questionnaire is included in Appendices.

In ordering and reordering response sets, items within existing and original instruments, and sections within the questionnaire, biases as a result of order effects cannot be discounted. It may have proven a useful in eliminating these possible biases to reorder and/or randomise these, but this was not done. Similarly, within the multi-item sections, item randomisation would in future work be a worthwhile methodological precaution.

On reflection after completion, certain questions and sections could be considered 'leading': e.g. all of the environmental behaviour instrument in Sections 3 and 5. This should be addressed in future work.

5.2.3.2 Post-survey respondent feedback

By the end of piloting, very few respondents objected to the order of questions and, having repeatedly revised the questionnaire in the light of feedback in the pilot stage, much of potential critical feedback was pre-empted.

As expected, several respondents objected to what they saw as the 'intrusiveness' or 'irrelevance' of some of the questions (presumably the attachment questions, though none was specific). A few were irritated at being forced into a 4-point Likert scale – whilst some registered discomfort by writing that the scale was forcing them to make a choice they did not feel was relevant, there were a greater (but still modest) number of instances of questions not answered, which seems to suggest that respondents who could not find an answer which readily expressed their opinion tended to not bother answering, although there could of course be alternative explanations for this, for example being in a rush.

Numerous respondents commented to the effect that pro-environmental behaviour was more a matter of poverty than piety for their parents' generation. This is an unanticipated but entirely valid criticism, but nevertheless a given. None of these comments would, if available before use of the questionnaire, likely have made important changes necessary, and none appear to cast serious doubt on the likely validity of any results.

A number of respondents pointed out that the questionnaire does not take account of marine environments, and this is on reflection a very good point. Freshwater from puddles and baths to rivers and lakes are favourite play environments for many children, and perhaps a whole separate category of marine environments, particularly beaches, needs to be incorporated. This would be especially important when examining populations that have in the past or now live near the sea, and future researchers should take note.

5.2.3.3 Data transcription

Verbatim data input of all 163 items per script was performed by hand keying throughout. The author entered a 10% sample; the remaining 90% was carried out by a qualified and experienced assistant (a paid, graduate psychologist) into a purpose-built database made to look nearly identical to the questionnaire so as to make transcription as user-friendly and error-free as possible. This database may be reusable in future as a web-based version of the questionnaire.

Transfer into the statistical software package SPSS 10 for Macintosh was accomplished via a roundabout route, necessitated by field length limitations and import and export format options, involving: export from Filemaker Pro 5 as tab delimited; import into AppleWorks 5 and export as Excel format; import into Excel 2001 and export as .dif; and finally import into SPSS via the guided importation routine. All other combinations were found to curtail, mutilate or lose data in certain fields at one stage or other. Even this route involved a field length limit which abbreviated a very few plain text (descriptive) fields, most commonly where the respondent had written at length in reply to an open-ended question. However a random sample of data was assessed and it is believed that no data corruption took place and, in any case, all the original data is available in the Filemaker database.

The following global coding rules were adopted:

- First answer validity: where a respondent gave more than one answer to a question requesting only one, the first was used;
- Alternating uncertainty: when answers are definite but equivocal, use a first left then right policy to fit them into coding categories;
- Spoiled scripts: where a response was indecipherable, record no answer;
- Omission: where no answer was made, record no answer.

At each stage, hand checking and correction took place against the original scripts, including a thorough checking by the author of a number of scripts and a random check of individual variables among the outsourced input data. All exceptional or suspect values were back-checked with original scripts during data manipulation, resulting in the correction of a very few mistakes. This low rate of known errors (below 2%) lends confidence that the transcription was at least 98% accurate.

Most of the data was unusable in its raw state following initial data entry, as it was recorded in non-computable terms (i.e. verbal or open field string variables). For each answer range a recoding into numeric form with appropriate value labeling in SPSS 10 was performed. This was the only manipulation performed on the majority of variables and therefore no further comment is made on recoding these. Certain data required a second level recoding in order to allow the derivation of numerous variables of use in a meaningful analysis, details of which are tabulated below. This included variables for which, following a preliminary examination of frequencies and in conjunction with a consideration of the potential for extracting meaning, it was decided to recode into aggregated groups (e.g. country of upbringing, education, employment). In this presentation, this has been completed only for those variables that have been used in later analyses: certain unused variables (e.g. vocation classification) have been left for aggregation at a later stage. Furthermore, with a view to the potential for comparison with other research findings, a series of recodings into standardised data coding schemes were carried out for certain demographic variables. Where the variable in question was original to this survey or possessed no standard coding scheme, tailor-made coding schemas were prepared, as detailed below.

5.2.3.4 Preparation of the data

Variables were derived from the raw data as follows:

5.2.3.4.1 Section 1: demographics

Question(s)	Variable(s) derived	Coding scheme
Q1.1: Present residence	Adult residence type	City/town/village/country not farm/farm
Q1.3/1.4/1.5: Sibling position, sex & numbers	No. of siblings/ sibling sex balance	0/1/2/3/4 or more siblings; Only child/all male/all female/mixed sex

Q1.8: Favourite(s) at school; Q1.7: University studied	Education subjects[9]	ISCED 97 area codes (International Standard Classification of Education: (UNESCO 1997))
Q1.6: When left education	Education level	ISCED 97 level codes (as above)
Q1.9: Respondent occupation; (Also Q3.1: Father's occupation; Q3.2: Mother's occupation)	Occupation[10]	SOC90 (Standard Occupational Classification 1990: UK Government Employment Department Group/Office of Population Censuses and Surveys)
(Derived from Q1.9)	Vocational groupings	RIASEC (Holland, 1996)
(As adult & as child; derived from Q1.9 & Q3.1)	Social class	NS-SEC (National Statistics Socio-Economic Classification: UK National Statistics office)
Q1.10 Age	Age bands	24 and under; 25-34; 35-44; 45-54; 55 and over

Table 5.7: List of derived demographic variables

5.2.3.4.2 *Section 2: childhood habitation/activities*

Question(s)	Variable(s) derived	Coding scheme
Q2.1: childhood country	Childhood country code; Rich/poor world	Scotland/England/Ireland/ Wales/(UK)/Europe & USA/ Rest of World – Affluent/ Rest of World - Poor; Rich world/poor world
Q2.2: number of childhood homes	Number of childhood locations	One/two/three/four or more
Q2.3: childhood residence	Child residence type; Urban/rural	City/town/village/country not farm/farm; Urban (= city or town)/ Rural (= village, country or farm)
Q2.5: main house type	Housing type; Childhood surroundings	High-rise/urban terraced house/ house in country/ built-up area semi-detached/open estate semi-detached;

[9] A further recoding to be performed at a later date will be a personal judgment of whether a person's education and vocational choice involves significant study of or interaction with animals, plants and the outdoors, or none of these.

[10] The most up to date (at the time of writing) UK standard occupational classification (SOC90) was used, with the addition of the following modifications (as personally advised by (Office of National Statistics 2002)):

030* Full-time student

040* Independent means (author's modification: includes retired)

050* Permanently sick

060* Full-time care of home and/or dependent relative

070* No previous occupation (used in this case for unemployed)

		Grey (= high-rise/urban terraced house/ built-up area semi-detached)/ Green (= house in country/open estate semi-detached)
Q2.10: describe favourite place	Favourite place type & location matrix	Near home-in nature/near home-not in nature/ far from home-in nature/far from home-not in nature[11]
Q2.11: feelings in favourite place	Feelings in favourite place	Transcendence/security/pleasure/ interest/ambivalence/dis-ease [12]
Q2.19: family pets owned	No. of pet types encountered; Mammal types encountered; Non-mammal types encountered	None/one/two/three/four or more.
Q2.22: favourite nature hobby	Favourite nature hobby type	Gardening/fishing-hunting/bird watching/ horse riding/observing-collecting/work-exercise/ all-none[13]
Q2.26: read/watch nature media	Nature media enthusiasm	Nothing more interesting on/ education-information/ parents interest-encouragement/ own interest-curiosity/ enjoyment-entertainment-beauty/ fascination-inspiration-wonder-loved animals or

[11] Manually recoded on an iterative, subjective assessment (or 'content analysis') basis of recurrent concepts. Two factors appeared most common: whether the favourite place was in nature or not, and whether near home or not. The author and two independent coders analysed each response to determine whether either or both of these two elements could reasonably be inferred. A preliminary analysis of inter-coder correlation suggested an acceptably high score of over 70% in all cases.

[12] Coded using a classification scheme for environmental autobiographic memories developed from analysis of published autobiographies (Chawla 1986), as an attempt to systematize the work of Cobb (1993). Chawla recorded descriptions of feelings of authors about being 'in nature', clustering them into categories which were then named. Two alternative readers matched the affective terms proposed with an inter-coder correlation of 0.92, justifying the original classification.

[13] A content analysis for groups of like hobbies was performed, first removing duplicates, then synonyms, finally conflating the remainder into this final list on the basis of perceived behavioural commonalities. A preliminary analysis of inter-coder correlation between the author and two independent raters suggested an acceptably high score of over 70% in all cases.

[14] A content analysis in which on the first pass all identical words were deleted; on the second pass concepts that appeared to be synonymic or significantly overlapping were clustered (e.g. 'parents encouraged me to' clustered with 'it was what I was allowed to watch'); on the third all unclassified replies that had not been mapped onto the existing concepts (less than 10% of replies) were matched to their closest equivalent cluster, and on the fourth the concepts were arranged into ascending order of apparent enthusiasm. Two additional volunteer coders performed a matching exercise to this

		plants [14]
Q2.29: nature mentor feelings	Mentor feeling type	Transcendence/security/pleasure/ interest/ambivalence/dis-ease[15]

Table 5.8: List of derived childhood variables

5.2.3.4.3 Section 3: parental work and environmental (eco-) actions

Questions 3.1 & 3.2: see Q1.9 under demographics above.

Questions 3.4 & 3.5: Only 9% answered yes to Q3.4, the remainder no, and there were few answers to Q3.5. Respondents clearly either could not remember environmental groups their parents belonged to or, perhaps just as likely, such memberships were far less common a generation and more ago. Therefore the variable for analysis is yes/no (= membership/no membership).

For Questions 3.6-3.15, two sets of variables were derived: an overall environmental ecoactivity index (computed as a proportion of total possible listed activities which subjects claim to do), and; a principal components (factor) analysis. Two factors with eigenvalues over 1 accounted for over 49% of variance. The questions loading on these factors (> 0.6)[16] were:

Factor 1, named 'Ecopractical', was made up of:

- Question 3.6 Parent Recycle
- Question 3.7 Parent Energy
- Question 3.8 Parent Packaging
- Question 3.9 Parent Compost

scheme from the original list, and preliminary analysis of inter-coder correlation suggested an acceptably high score of over 70% in all cases.

[15] A content analysis was begun for this response but on comparison with the results of Question 2.11 it became clear that, although Chawla's (1986) classification scheme was designed for memories of experiences of place, the scheme appeared applicable to this equally emotion-laden variable.

[16] According to Kline (1994), factor loadings of 0.3 or higher may be significant.

- Question 3.10 Parent Water
- Question 3.11 Parent Green Products

Factor 2, named 'Ecopolitical', was made up of:

- Question 3.13 Parent Donate
- Question 3.14 Parent Protest
- Question 3.15 Parent Political

Question 3.12 loads well below 0.5 on both Factors and was therefore discounted.

Question(s)	Variable(s) derived	Coding scheme	Scale reliability (alpha)
Q3.6-3.15 Eco-activities	Parental ecoactivity index	Absolute score, and levels (inactive/ hypoactive/ active/ hyperactive)[17]	.7650
	Parental ecopractical factor	Numeric difference (+/-) from mean factor score	.7600
	Parental ecopolitical factor	Numeric difference (+/-) from mean factor score	.6784

Table 5.9: List of derived parental ecoactivity variables

5.2.3.4.4 Section 4: charitable giving

In the original use of this 'relative sympathies' instrument (Paul, 1992), responses were grouped into animal welfare causes (Q4.3 & 4.5), environmental causes (Q4.1 & 4.7) and human (the remainder) to give three simple additive scores, although since the human score rested on twice as many items it was not clear how comparisons were made between them. In this instance, three sets of variables were derived: respondents were classified into one of 3 categories and one of 4 categories (by separating the human items into those of global (Q4.4 & 4.8) and national (Q4.2 & 4.4.6) concern), and; a principal components (factor) analysis was performed with 3 and 4 factors: the 3 factor solution followed the original

[17] Scale based on quartiles of mean score for questions answered.

instrument, whereas the results of the 4 factor solution seemed to confuse matters so were not pursued. Factors loading >0.5 were:

Factor 1, 'Environmental sympathy', was made up of:

- Question 4.1 Habitats
- Question 4.7 Rainforests
- Question 4.2 Cancer (negative loading)
- Question 4.6 Hospice (negative loading)

Factor 2, 'Animal sympathy', was made up of:

- Question 4.3 Vivisection
- Question 4.5 Animal Neglect

Factor 3, 'Human sympathy', was made up of:

- Question 4.4 Torture
- Question 4.8 Disasters

Question(s)	Variable(s) derived	Coding scheme
Q4.1-4.8 charitable giving	Sympathy category of 3	Environmental/ animal/ human[18]
	Sympathy category of 4	Environmental/ animal/ human-global/ human-national
	Environmental sympathy factor	Numeric difference (+/-) from mean factor score
	Animal sympathy factor	Numeric difference (+/-) from mean factor score
	Human sympathy factor	Numeric difference (+/-) from mean factor score

Table 5.10: List of derived charitable giving variables

[18] Respondents were placed into the categories to which they allocated most money. Where they allocated equal amounts to two or more categories, a rule of alternating category was adopted, such that approximately equal numbers of matching ambiguous subjects were placed in each category for which this was the case.

5.2.3.4.5 Section 5, first half: present environmental (eco-)activities

As with the use of this instrument for Parental Ecoactivity, two sets of variables were derived from Questions 5.17-5.26: an overall environmental activity index, and; a principal components (factor) analysis. Three factors with eigenvalues over 1 accounted for over 61% of variance. Grouping questions that load above 0.5, the following factors emerge:

Factor 1: 'Ecopolitical', was made up of:

- Question 5.19 Packaging
- Question 5.22 Green Products
- Question 5.24 Donate
- Question 5.25 Demos
- Question 5.26 Politics

Factor 2: 'Ecopractical', was made up of:

- Question 5.17 Recycle
- Question 5.18 Energy
- Question 5.20 Compost
- Question 5.21 Water

Factor 3: 'Ecotransport', was made up of:

- Question 5.23 Transport

It should be noted that although the Ecoactivity Factors for parents and adults clearly overlap, the two most 'consumerist' oriented items have 'jumped' from the Ecopractical to the Ecopolitical Factor between generations. The normal level for confidence in scale reliability is .7: therefore the reliability of Factor 2 at .5886 suggests that conclusions that draw on this should be treated with caution. Since Factor 3 loaded most heavily on just one item, it was not used in further analysis.

Question(s)	Variable(s) derived	Coding scheme	Scale reliability (alpha)
Q5.17-5.26 Adult eco-activities	Adult ecoactivity	Inactive/ hypoactive/ active/ hyperactive [19]	.8134
	Adult ecopolitical factor	Numeric difference (+/-) from mean factor score	.8054
	Adult ecopractical factor	Numeric difference (+/-) from mean factor score	.5886
	Adult ecopolitical factor	Numeric difference (+/-) from mean factor score	Not calculated

Table 5.11: List of derived adult ecoactivity variables

5.2.3.4.6 Section 5, second half: present environmental actions

Three sets of variables were calculated from the results of this section: an additive total score for all outdoor activity ('Outdoorsiness'); a principal components (factor) analysis, and; classification of each respondent into one of four categories of activity preference. Outdoorsiness was computed as a mean of questions answered. For the factor analysis, four factors with eigenvalues over 1 accounted for over 53% of variance. The questions loading on these factors (> 0.5 or, where less, their maximum loading) were:

Factor 1, termed 'At Ease', was made up of:

- Question 5.2 Walk Other
- Question 5.5 Long Walk
- Question 5.6 Camping
- Question 5.7 Visit Wild
- Question 5.13 No Motor Sport

Factor 2, termed 'Loner', was made up of:

- Question 5.11 Bird Watch
- Question 5.12 Nature Study
- Question 5.15 Nature TV

[19] Scale based on quartiles of mean score for questions answered.

- Question 5.16 Nature Read

Factor 3, termed 'Utilitarian', was made up of:

- Question 5.3 Walk Pet
- Question 5.4 Walk Alone
- Question 5.9 Fishing (weak correlation but no other was higher)
- Question 5.10 Field Sport
- Question 5.14 Motor Sport

Factor 4, termed 'Pragmatic', was made up of:

- Question 5.1 Outdoor Job
- Question 5.6 Camping (moderate negative correlation)
- Question 5.8 Gardening

Question(s)	Variable(s) derived	Coding scheme	Scale reliability (alpha)
Q5.1-5.16 Outdoor activities	'Outdoorsiness'	Indoorsy/ hypooutdoorsy/ outdoorsy/ hyperoutdoorsy[20]	.7259
	Outdoorsiness 'At Ease' factor	Numeric difference (+/-) from mean factor score	.7052
	Outdoorsiness 'Loner' factor	Numeric difference (+/-) from mean factor score	.7410
	Outdoorsiness 'Utlitarian' factor	Numeric difference (+/-) from mean factor score	.5261[21]
	Outdoorsiness 'Pragmatist' factor	Numeric difference (+/-) from mean factor score	.4355
	Outdoorsiness category	At ease/ loner/ utilitarian/ pragmatist[22]	N/a

Table 5.12: List of derived outdoorsiness variables

[20] Classified on the basis of sample quartiles

[21] Modest Alpha value including the poorly correlated Fishing item, but reliability is decreased by removing the item so it has been left in.

[22] Respondents allocated into categories on the basis of the factor for which they exhibited the greatest deviation from the sample mean category scores.

The Nature Utilitarian Alpha of .5261 is not sufficiently close to .7 for great reliability, and the Nature Pragmatic Alpha of .4355 is low and therefore subjects the factor to suspicion over reliability.

5.2.3.4.7 Section 6: adult attachment

As per the PBI (Parker, Tupling et al. 1979), the 25 responses to each use (paternal, maternal relationship) of the instrument measure 2 distinct factors. In each case a mean of the 12 (care) and 13 (overprotection) questions is computed to register a score for that factor. Those two scores combine to yield a parental attachment status for each parent. All alphas are high and indicative of a mature and robust instrument.

Question(s)	Variable(s) derived	Coding scheme	Scale reliability (alpha)
Q6.1-6.25	Paternal care; Paternal overprotection	High/low[23]	.9138; .8135
	Paternal attachment status	Secure/ affectionate constraint/ weak bonding/ affectionless control[24]	-
Q6.26-6.50	Maternal care; Maternal overprotection	High/low[23]	.9295; .8974
	Maternal attachment status	Secure/ affectionate constraint/ weak bonding/ affectionless control[24]	-

Table 5.13: List of derived attachment variables

5.2.3.4.8 Section 7, first half: attitudes and beliefs towards nature

Two sets of variables were calculated from the results of this section (Questions 7.1-7.12): a principal components (factor) analysis, and classification of each respondent into one of four categories of ecoevaluation preference. For the factor analysis, four factors with

[23] Low = score in lower half of scale; high = in top half of scale.

[24] Secure attachment status = high care + low overprotection; affectionate constraint = high care + high overprotection; weak bonding = low care + low overprotection; affectionless control = low care + high overprotection.

eigenvalues over 1 accounted for over 58% of variance. The questions loading on these factors (> 0.5 or, where less, their maximum loading) were:

Factor 1, termed 'Anthropocentric', was made up of:

- Question 7.2 People First
- Question 7.7 Meaning
- Question 7.11 Endangered
- Question 7.12 Desires

Factor 2, termed 'Technocentric', was made up of:

- Question 7.3 Emotive
- Question 7.4 Science

Factor 3, termed 'Conservationist', was made up of:

- Question 7.8 Part Nature
- Question 7.9 Parts

Factor 4, termed 'Ecocentric', was made up of:

- Question 7.1 Money Can't
- Question 7.5 Diversity
- Question 7.6 Protection
- Question 7.10 Wilderness

Question(s)	Variable(s) derived	Coding scheme	Scale reliability (alpha)
Q7.1-7.12 Ecoevaluation statements	Ecoevaluation 'Anthropocentric' factor	Numeric difference (+/-) from mean factor score	.7327
	Ecoevaluation 'Technocentric' factor	Numeric difference (+/-) from mean factor score	.6295
	Ecoevaluation	Numeric difference (+/-) from mean	.5987

	'Conservationist' factor	factor score	
	Ecoevaluation 'Ecocentric' factor	Numeric difference (+/-) from mean factor score	.2147
	Ecoevaluation category	Anthropocentric/ Technocentric/ Conservationist/ Ecocentric[22]	N/a

Table 5.14: List of derived ecoevaluation variables

Adult Ecoevaluations scale rating alpha = .4564: this scale is divergent overall so this low score is not problematic - more store is set on the alphas of the sub-scales. However the 'Conservationist' alpha of .5987 is not sufficiently close to .7 for great reliability. More concerning however is the 'Ecocentric' alpha of .2147: declining sub-scale reliability is to be expected from derived factors, but this last value is low and the factor therefore of questionnable robustness – which is surprising given previous researchers' findings and the commonalities evident in the questions which load onto the factor.

Note: In line with the convention that places technocentrism and ecocentrism at opposite extremes of a continuum of environmental values, these factors will henceforth be referred to in the order technocentric, anthropocentric, conservationist and ecocentric (T, A, C, E).

5.2.3.4.9 Section 7, second half: emotional responses to nature

Two sets of variables were calculated from the results of this section (Questions 7.13-7.24): a principal components (factor) analysis, and a classification of each respondent into one of four categories of ecoemotionality preference. In factor analysis, four factors with eigenvalues over 0.915 accounted for over 64% of variance. The questions loading on these factors (> 0.5) were:

Factor 1, termed 'Secure', was made up of:

- Question 7.15 Memories
- Question 7.17 Unaffected
- Question 7.19 Unknown
- Question 7.21 Uplifted
- Question 7.23 Close

Factor 2, termed ‘Fearful’, was made up of:

- Question 7.16 Indoors
- Question 7.22 Anxious
- Question 7.24 Nothing

Factor 3, termed ‘Dismissive’, was made up of:

- Question 7.13 Civilize
- Question 7.20 Silly

Factor 4, termed ‘Stoic’, was made up of:

- Question 7.14 Wasps
- Question 7.18 Less Happy

Question(s)	Variable(s) derived	Coding scheme	Scale reliability (alpha)
Q5.1-5.16 Outdoor activities	Ecoemotionality ‘Secure’ factor	Numeric difference (+/-) from mean factor score	.7618
	Ecoemotionality ‘Fearful’ factor	Numeric difference (+/-) from mean factor score	.7501
	Ecoemotionality ‘Dismissive’ factor	Numeric difference (+/-) from mean factor score	.5382
	Ecoemotionality ‘Stoic’ factor	Numeric difference (+/-) from mean factor score	.0144
	Ecoemotionality category	At ease/ loner/ utilitarian/ pragmatist[22]	N/a

Table 5.15: List of derived ecoemotionality variables

Adult Ecoevaluations scale rating alpha = .3060: this scale is known to be divergent overall so this low score is not problematic - more store is set on the alphas of the sub-scales. However the ‘Dismissive’ alpha of .5382 is not sufficiently close to .7 for great reliability. Far more concerning however is the ‘Stoic’ alpha of .0144: this worryingly low value suggests that Stoic may not be a meaningful factor – which is, as with Ecocentric above, surprising given the apparent commonalities evident in the questions loading onto the factor. However it is included in subsequent analysis for comparative purposes mainly on the

grounds that the other environmental values scale, and several other scales, have resulted in four distinct factors.

This completes the description of data preparation.

Chapter 6: Analysis of major hypotheses

The three major hypotheses are tested in turn against the data.

6.1 Hypothesis one: Adult attitudes to nature are related to parental attachment status

The first hypothesis predicted that there would be a relationship between the attitudes to nature held by adult respondents, and their parental attachment status.

In order to test this hypothesis, the relationship between the two attitude to nature scales, the relative sympathies scale, and parental attachment status was explored (see chapter 5 for detail on how the attitude scales and attachment status scores were derived).

The first test examined the relationship between overall attachment status and attitudes to nature as represented by ecoevaluation scale scores. This test was performed separately for fathers and for mothers. The test was a mixed 2-way MANOVA, with the between subjects independent variable being attachment status (secure, affectionate constraint, weak bonding, affectionate control) and the within subjects dependent variable being ecoevaluation status. The levels of the ecoevaluation status variable were represented by the four factor scores derived from the ecoevaluation scale (technocentric, anthropocentric, conservationist, ecocentric). The mean values for these four factor scores by attachment status are shown in the following Table.

6.1.1 Paternal attachment status and ecoevaluation

	Technocentric		Anthropocentric		Conservationist		Ecocentric	
	M[25]	SD	M	SD	M	SD	M	SD
Secure	.07	1.00	-.02	.95	-.05	1.01	-.12	.95
Affectionate constraint	-.22	.92	-.04	1.04	.04	1.08	.47	1.47
Affectionless control	-.57	.92	.46	.94	.25	1.03	-.15	.60
Absent bonding	-.04	1.01	-.03	1.19	.12	.98	.41	1.02

Table 6.1: Paternal attachment status by ecoevaluation status

[25] Throughout, M = mean, SD = standard deviation and CI = confidence interval (95% in all cases). Where units are not stated, measurements are on the various Assigned Scales (i.e. arbitrary).

The MANOVA test revealed that there was a significant interaction between paternal attachment status and ecoevaluation status ecocentric, with F (3, 221) = 4.04, p <.01 (the sum of squares table for this analysis is shown at Appendix 11.3.1.1).

To examine this interaction, the relevant simple effects were calculated. The analysis revealed that there was a significant difference between the ecocentric scores for participants who showed secure attachment status and participants who showed absent bonding attachment status, with latter showing higher ecocentrism.

To further examine the relationship between attachment status, as represented by the paternal care factor score and by paternal overprotection factor score, and the four ecoevaluation factors, bivariate correlations were computed. The results of these analyses are shown in the Table below.

		Technocentric	Anthropocentric	Conservationist	Ecocentric
Care Score	Pearson Correlation	.082	-.018	-.027	-.127
	Sig. (2-tailed)	.221	.788	.687	.058
	N	225	225	225	225
Overprotection Score	Pearson Correlation	-.068	.114	-.025	.060
	Sig. (2-tailed)	.307	.089	.714	.371
	N	225	225	225	225

Table 6.2: Correlations between paternal care and overprotection factor scores and ecoevaluation factor scores

The results showed that there were no significant correlations between either paternal scores on care or on overprotection and the four ecoevaluation factor scores. A negative correlation was close to significance (p =.058)[26] for paternal care versus ecocentric, however.

6.1.2 Maternal attachment status and ecoevaluation

The same analyses were then performed for maternal attachment status. The mean values for these four factor scores by attachment status are shown in the Table below.

[26] Tabulated *p* values have been reported throughout to three decimal places. Textual references to these values are made to the rounded categories of < .01 and < .05, as appropriate (values of between .051 and .055 being rounded down to .05), *except* where particular attention is drawn to suggestive correlations that fall just outside significance, in which case (as here) three decimal places are used.

	Technocentric		Anthropocentric		Conservationist		Ecocentric	
	M	SD	M	SD	M	SD	M	SD
Secure	.06	.99	-.03	1.03	-.01	1.01	-.03	1.02
Affectionate constraint	-.05	.95	.22	.91	-.01	1.05	-.05	.79
Affectionless control	-.15	1.40	-.28	.85	-.34	.70	.78	1.11
Absent bonding	-.42	.96	.11	.88	.48	.99	-.06	1.01

Table 6.3: Maternal attachment status by ecoevaluation status

The MANOVA test revealed no significant interactions between maternal attachment status and ecoevaluation status (the sum of squares table is shown at Appendix 11.3.1.2).

To further examine this relationship, relevant simple effects were calculated. The results showed no significant difference between maternal attachment status and the ecoevaluation factor scores (although levels of ecoevaluation status ecocentric between those with maternal attachment status secure and affectionless control came close to significance at p= .057).

		Technocentric	Anthropocentric	Conservationist	Ecocentric
Care Score	Pearson Correlation	.104	.001	-.060	-.127
	Sig. (2-tailed)	.114	.993	.364	.054
	N	230	230	230	230
Overprotection Score	Pearson Correlation	-.029	.103	.027	.084
	Sig. (2-tailed)	.665	.120	.679	.204
	N	230	230	230	230

Table 6.4: Correlations between maternal care and overprotection factor scores and ecoevaluation factor scores

The results showed that, notably similarly to the paternal situation, there was a significant correlation between ecocentric and care such that higher maternal care reduces ecocentrism.

6.1.3 Paternal attachment status and ecoemotionality

The second test examined the relationship between attachment status and attitudes to nature as represented by ecoemotionality scale scores. This test was performed separately for fathers and for mothers. The test was a mixed 2-way MANOVA, with the between subjects independent variable being attachment status (secure, affectionate constraint, weak bonding, affectionate control) and the within subjects dependent variable being ecoemotionality status. The levels of the ecoemotionality status variable were represented by the four factor

scores derived from the ecoemotionality scale (secure, fearful, dismissive, stoic). The mean values for these four factor scores by attachment status are shown in the following Table.

	Secure		Fearful		Dismissive		Stoic	
	M	SD	M	SD	M	SD	M	SD
Secure	-.06	.99	-.05	.93	.03	.99	.03	.95
Affectionate constraint	.42	.75	.12	.91	.05	1.13	-.27	1.27
Affectionless control	-.06	1.13	.35	.79	-.34	.98	-.48	.61
Absent bonding	.36	1.00	.12	1.40	-.02	1.03	.09	1.20

Table 6.5: Paternal attachment status by ecoemotionality status

The MANOVA test revealed that there was a significant interaction between paternal attachment status and ecoemotionality status nature secure, with F (3, 247) = 2.64, p <.05 (the sum of squares table for this analysis is shown at Appendix 11.3.1.3).

To examine this interaction, the relevant simple effects were calculated. The analysis revealed that there were no significant differences between the ecocentric scores for participants with different paternal attachment status.

6.1.4 Maternal attachment status and ecoemotionality

The same analyses were then performed for maternal attachment status. The mean values for these four factor scores by attachment status are shown in the Table below.

	Secure		Fearful		Dismissive		Stoic	
	M	SD	M	SD	M	SD	M	SD
Secure	.01	1.02	-.05	1.06	.04	1.01	.11	.95
Affectionate constraint	.05	1.04	.09	.85	.06	.98	-.22	1.02
Affectionless control	.05	.91	.20	.94	-.09	.94	-.65	.78
Absent bonding	-.14	.74	.14	.78	-.44	.95	-.11	1.41

Table 6.6: Maternal attachment status by ecoemotionality status

The MANOVA test revealed that there was a significant interaction between maternal attachment status and ecoemotionality status nature stoic, with F (3, 253) = 3.39, p <.05 (the sum of squares table for this analysis is shown at Appendix 11.3.1.4).

To examine this interaction, the relevant simple effects were calculated. The analysis revealed that there was a significant difference between the nature stoic scores for

participants who showed secure attachment status and participants who showed affectionless control attachment status, with the latter exhibiting lower nature stoicism.

To further examine the relationship between attachment status, as represented by the maternal care factor score and by maternal overprotection factor score, and the four ecoemotionality factors, bivariate correlations were computed. The results of these analyses are shown in the Table below.

		Secure	Fearful	Dismissive	Stoic
Care Score	Pearson Correlation	-.010	-.063	.174**	.087
	Sig. (2-tailed)	.871	.318	.005	.167
	N	257	257	257	257
Overprotection Score	Pearson Correlation	.070	.123*	-.006	-.135*
	Sig. (2-tailed)	.261	.049	.917	.030
	N	257	257	257	257

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Table 6.7: Correlations between maternal care and overprotection factor scores and ecoemotionality factor scores

The results showed that there were significant correlations between maternal overprotection and ecoemotionality factor fearful, between maternal overprotection and ecoemotionality factor stoic (negative), and a highly significant correlation between maternal care and ecoemotionality factor dismissive.

6.1.5 Paternal attachment status and relative sympathies

The third and final test examined the relationship between overall attachment status and attitudes to nature as represented by relative sympathy scale scores. This test was performed separately for fathers and for mothers.

The test was a mixed 2-way MANOVA, with the between subjects independent variable being attachment status (secure, affectionate constraint, weak bonding, affectionate control) and the within subjects independent variables being relative sympathy status. The levels of the relative sympathy status variables were represented by the three factor scores derived from the relative sympathy scale (environmental, animal, human). The mean values for these three factor scores by attachment status are shown in the following Table.

	Environment Sympathy		Animal Sympathy		Human Sympathy	
	M	SD	M	SD	M	SD
Secure	-.05	1.01	-.02	.94	-.10	.96
Affectionate constraint	-.28	.87	.31	1.76	.14	1.23
Affectionless control	.21	1.18	-.09	1.18	.01	1.04
Absent bonding	.30	.88	.06	.90	.22	.90

Table 6.8: Paternal attachment status by relative sympathies

The MANOVA test revealed that there was no significant interaction between paternal attachment status and relative sympathies (the sum of squares table for this analysis is shown at Appendix 11.3.1.5).

		Environment Sympathy	Animal Sympathy	Human Sympathy
Care Score	Pearson Correlation	-.131*	-.036	-.033
	Sig. (2-tailed)	.030	.557	.590
	N	274	274	274
Overprotection Score	Pearson Correlation	-.035	.072	.013
	Sig. (2-tailed)	.565	.233	.832
	N	274	274	274

Table 6.9: Correlations between paternal care and overprotection factor scores and relative sympathy factor scores

The results showed a significant negative correlation between paternal care and environment sympathy.

6.1.6 Maternal attachment status and relative sympathies

The same analyses were then performed for maternal attachment status. The mean values for these three factor scores by attachment status are shown in the Table below.

	Environment Sympathy		Animal Sympathy		Human Sympathy	
	M	SD	M	SD	M	SD
Secure	-.01	.96	-.02	1.02	-.02	.97
Affectionate constraint	-.05	1.08	-.02	.91	-.13	.91
Affectionless control	.27	1.25	.17	1.17	.09	1.18
Absent bonding	.08	1.12	.04	.95	.22	1.31

Table 6.10: Maternal attachment status by relative sympathies

The MANOVA test revealed that there was no significant interaction between maternal attachment status and relative sympathies (the sum of squares table for this analysis is shown at Appendix 11.3.1.6).

		Environment Sympathy	Animal Sympathy	Human Sympathy
Care Score	Pearson Correlation	-.114	-.079	-.068
	Sig. (2-tailed)	.057	.185	.257
	N	281	281	281
Overprotection Score	Pearson Correlation	.024	.108	-.015
	Sig. (2-tailed)	.684	.070	.802
	N	280	280	280

Table 6.11: Correlations between maternal care and overprotection factor scores and relative sympathy factor scores

The results showed no significant correlations, although maternal care came close to a negative correlation with environment sympathy (p= .057) and maternal overprotection came close to a correlation with animal sympathy (p= .07).

6.1.7 Attachment and exploring nature

Tests were performed to explore the potential within-childhood effects of parental attachment patterns on childhood behaviour.

This set of tests examined the relationship between having had a favourite place as a child and parental attachment factor scores. Favourite place was analysed in three forms: on the basis of a yes/no, and (from participant descriptions, on the basis of content analysis) whether that place was in nature or not, or near or away from home (see chapter 5 for full derivations of these variables). The first tests were a set of 3, mixed 2-way MANOVAs, with the between subjects independent variables being, respectively, favourite place (yes, no), favourite place (in nature, not in nature), and favourite place (near home, away from home), and the within subjects dependent variable being parental attachment status represented by the two factor scores derived from the attachment scale (care, overprotection). The mean values for these two factor scores by favourite place variables, for each parent, are shown in the following Table.

		Paternal Care		Paternal Overprotection		Maternal Care		Maternal Overprotection	
		M	SD	M	SD	M	SD	M	SD
FavPlace	Favourite place	2.05	.70	.90	.47	2.29	.69	1.03	.60
	No favourite place	2.00	.55	.90	.45	2.27	.54	1.06	.57
FavPlace Nature/Not	Favourite place in nature	2.04	.69	.89	.43	2.27	.70	1.03	.58
	Favourite place not in nature	2.17	.89	.79	.56	2.58	.55	.90	.59
	Unclassifiable	1.67	.35	1.09	.25	1.79	.18	1.08	.11
FavPlace Home/Away	Favourite place near home	1.89	.74	.79	.40	2.19	.81	.86	.59
	Favourite place away from home	2.11	.68	.95	.46	2.34	.62	1.11	.57
	Unclassifiable	2.08	.74	.80	.40	2.29	.75	.94	.57

Table 6.12: Favourite place variables by parental attachment factor scores

The MANOVA tests revealed a significant interaction between favourite place proximity and maternal overprotection, with $F(1, 154) = 5.56$, $p < .05$. Figure 6.1 reveals that a favourite place away from home relates to significantly higher maternal overprotection. There is also a pattern of higher scores on all factors, for both parents, for those with a favourite place away from home.

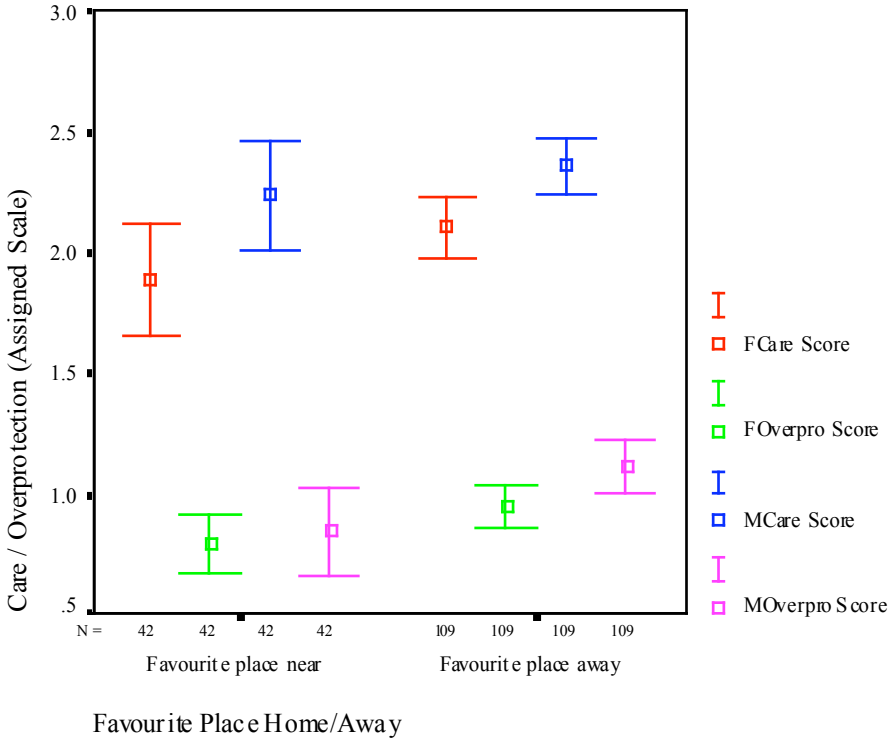


Figure 6.1: Favourite place location versus parental attachment factor scores

Among other 'exploration' variables, the MANOVA test reveals a significant relationship between paternal overprotection and play at F (40, 240) = 1.43, p = .05, and both play ($p <$ .01) and wander ($p <$ .05) correlate negatively. Figure 6.2 reveals that low overprotection is associated with higher play and wander.

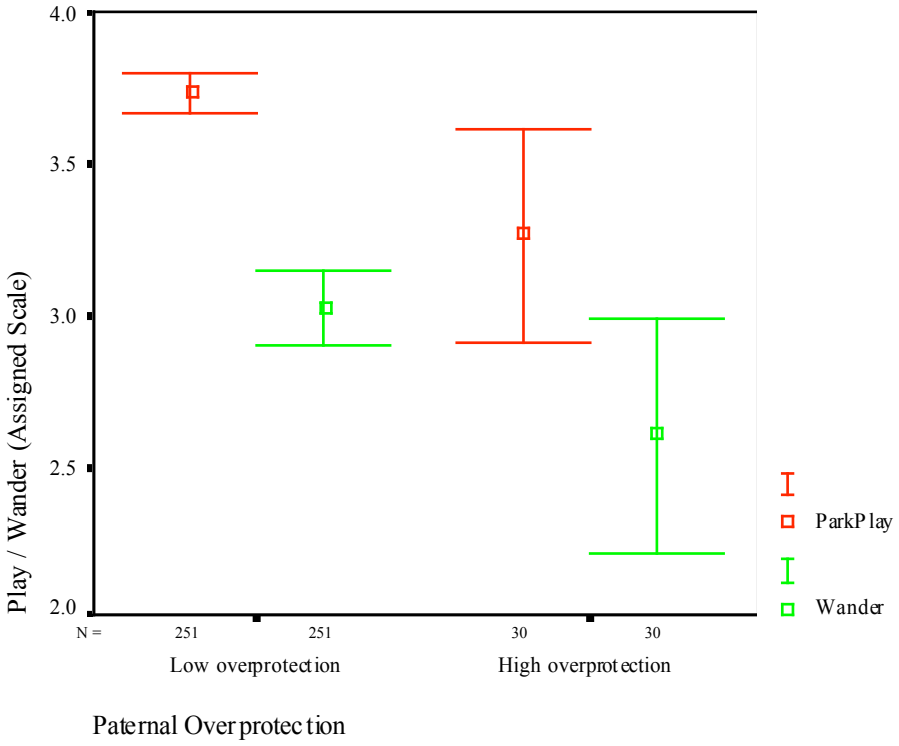


Figure 6.2: Play / Wander versus paternal overprotection

6.1.8 *Attachment versus other selected attitude and behaviour measures*

Finally, a series of separate ANOVA tests were performed for attachment status versus selected attitudinal (relative sympathy category of 3 and of 4, ecoevaluation maximum variance, ecoemotionality maximum variance) and unexamined behavioural (parental ecoactivity category, adult ecoactivity category, outdoorsiness category) measures, for both mother and father (see chapter 5 for derivation of all these factors). Collated sum of squares tables for the variables tested are to be found at Appendices 11.3.1.7 and 11.3.1.8.

6.1.8.1 Paternal attachment status

Only EcoActiveNow (= adult ecoactivity) category is significant versus paternal attachment ($F = 2.91$, $p < .05$). To examine this interaction, the relevant simple effects were calculated. The analysis revealed that there was a significant difference between the adult ecoactivity scores for participants who showed secure attachment status and participants who showed absent bonding attachment status, with the latter exhibiting higher adult ecoactivity.

Further analysis using the MANOVA test with variables paternal care, paternal overprotection, and adult ecoactivity revealed a significant relationship ($F = (38, 58)\ 2.17$, $p < .01$), in which the higher the level of adult ecoactivity, the lower the paternal care score.

6.1.8.2 Maternal attachment status

No measures were significant versus Maternal Attachment.

6.1.9 Other notable results

Further tests examined the relationship between attachment factor scores care and overprotection for each parent, and other factors. None proved significant or notable apart from the following.

6.1.9.1 Maternal care and sample sub-group

There are differences between sample sub-groups with regard to maternal care score. Whilst the mean for the whole sample falls as would be expected from the norm amongst all general populations squarely into the secure/optimal bonding quadrant of the PBI (Care score >1.5; Overprotection score < 1.5), and the mean for each of the sample sub-groups falls into the same quadrant, a single sub-group is different. Compared to the other sub-groups, the CHE Sample Sub-group has conspicuously low maternal care and high maternal overprotection scores, placing the group mean in the weak bonding/dismissing avoidant category and close to the affectionless control/fearful (Bartholomew 1997; Parker, Tupling et al. 1979) attachment category.

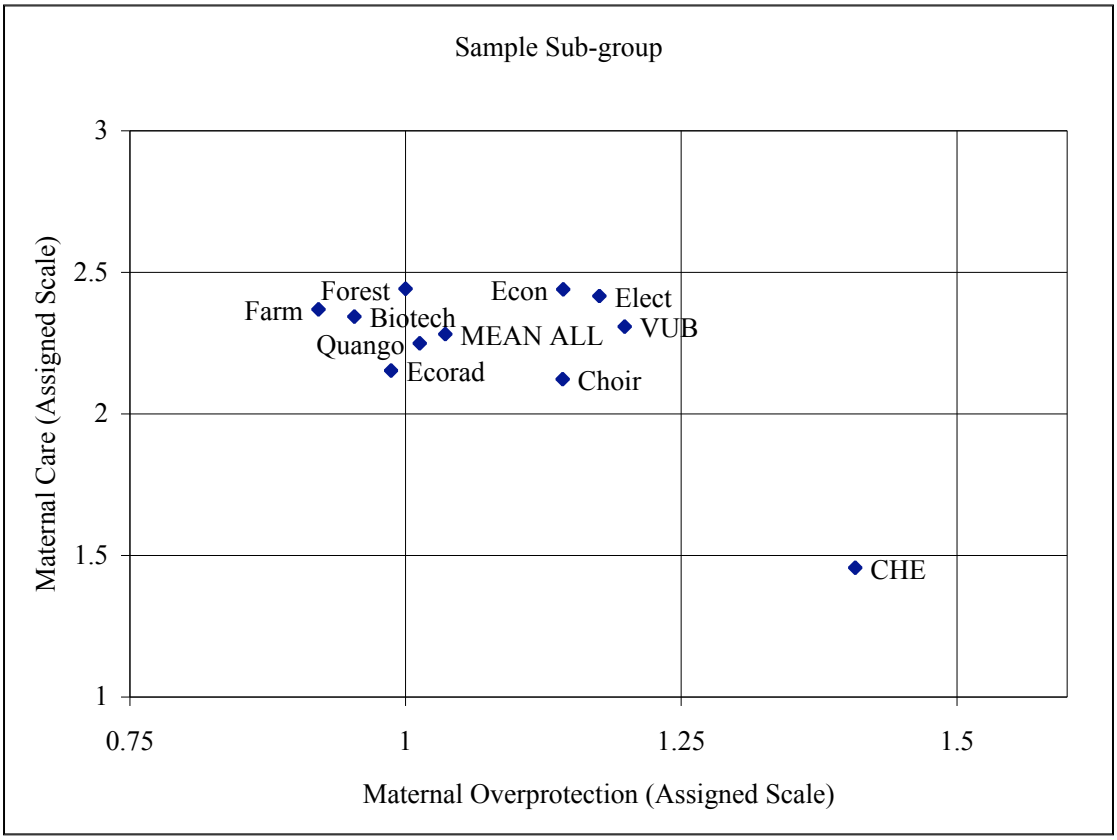


Figure 6.3: Maternal Attachment Status versus Sample Sub-group

6.1.10 Summary of findings

6.1.10.1 Paternal attachment

- Ecoevaluation status ecocentric differs according to paternal attachment status: further investigation show that there is a close to significant (p =.058) negative correlation between attachment factor paternal care and the ecoevaluation factor ecocentric;
- Ecoemotionality nature secure differs according to paternal attachment;
- Environment sympathy is negatively correlated with paternal care;
- Subjects with absent bonding attachment status have higher adult ecoactivity levels than those with secure attachment status;
- The lower the paternal care score, the higher the adult ecoactivity level;

- There is a significant relationship, between paternal overprotection and play, with low overprotection correlated with higher play and wander.

6.1.10.2 Maternal attachment

- Ecoevaluation factor ecocentric is close to significantly different (p = .057) between those with maternal attachment status secure and affectionless control;
- Maternal care has a significant negative correlation (p = .054) with ecoevaluation factor ecocentric (similar to the paternal situation);
- Ecoemotionality nature stoic differs according to maternal attachment status;
- Maternal overprotection is correlated with ecoemotionality factors fearful and stoic (negative); maternal care is correlated with ecoemotionality dismissive;
- Maternal care has a close to significant negative correlation (p = .057) with environment sympathy;
- Mean attachment status of the whole sample and of all sample sub-groups is secure bonding, except for sub-group CHE, which is dismissing avoidant;
- Higher maternal overprotection is significantly related to favourite place away from rather than near home;
- All attachment factor scores, for both parents, are higher (though mostly non-significantly) for those whose favourite place was away from home.

6.2 Hypothesis two: Adult attitudes to nature are affected by direct contact with nature as a child

The second hypothesis concerns the first of Kellert's (1996; 2002) three domains of childhood nature experience, 'direct' experience (which appears strongly coincident with both Cobb and Chawla's 'ecstatic places' and Palmer et al's 'experiences of the natural world'), postulating that there is a relationship between the attitudes to nature held by adult respondents, and their experiences of first-hand contact with nature as a child.

In order to test this hypothesis, two sets of relationships were analysed. First, the relationships between the two attitude to nature scales, the relative sympathies scale and the childhood variable *place of residence* was assessed (this latter variable was employed as a proxy for the prevalence of nature close to the child's home: the variables *garden* and *park near*, and their combined index *access to greenery*, were not used as over 92.2% of sample respondents answered yes to the first, 95.9% to the second, and in combination the proportion of children who had one or the other was 98.6%, rendering analysis or presence-versus-absence statistically unreliable).

Second, the relationships between the same set of attitude and relative sympathies scales and primarily the childhood variables *play*, *wander*, and *favourite place* (describing respectively how often the adult played outside as a child, recalled wandering more than 20 minutes from home, and recalled having had a favourite place) were assessed (see chapter 5 for detail on how the attitude scales and nature interaction variables were derived).

6.2.1 Accessible nature and attitudes to nature

This set of tests examined the relationship between overall accessibility of nature to the child as represented by the variable place of residence and, by turns, ecoevaluations, ecoemotionality and relative sympathies.

6.2.1.1 Accessible nature and ecoevaluation

The first test was a mixed 2-way MANOVA, with the between subjects independent variable being place of residence (urban, rural, farm) and the within subjects dependent

variable being ecoevaluation status represented by the four factor scores derived from the ecoevaluation scale (technocentric, anthropocentric, conservationist, ecocentric). The mean values for these four factor scores by attachment status are shown in the following Table.

	Technocentric		Anthropocentric		Conservationist		Ecocentric	
	M	SD	M	SD	M	SD	M	SD
Urban	-.12	1.05	-.01	1.04	.07	1.04	.01	1.04
Rural	.03	.95	-.18	.97	.11	.91	.05	.90
Farm	.25	.90	.22	.90	-.29	.94	-.08	1.00

Table 6.13: Childhood residence by ecoevaluation factor scores

The MANOVA test revealed that there was a significant interaction between place of residence and ecoevaluation factor conservationist with F (2, 229) = 2.99, p = .052 (the sum of squares table for this analysis is shown at Appendix 11.3.2.1).

To examine this interaction, the relevant simple effects were calculated. The results showed a significant difference for subjects with childhood place of residence farm between ecoevaluation factor scores conservationist (low) and technocentric/anthropocentric (high). It is evident that farm children are particularly highly technocentric and anthropocentric, and particularly lowly conservationist.

6.2.1.2 Accessible nature and ecoemotionality

The second test was a mixed 2-way MANOVA, with the between subjects independent variable being place of residence (urban, rural, farm) and the within subjects dependent variable being ecoemotionality status represented by the four factor scores derived from the ecoemotionality scale (secure, fearful, dismissive, stoic). The mean values for these four factor scores by attachment status are shown in the following Table.

	Secure		Fearful		Dismissive		Stoic	
	M	SD	M	SD	M	SD	M	SD
Urban	.12	1.06	.18	1.11	-.17	.97	-.04	.96
Rural	.08	.91	-.20	.78	-.05	1.08	.18	.92
Farm	-.38	.85	-.25	.81	.50	.82	-.08	1.16

Table 6.14: Childhood residence by ecoemotionality factor scores

Examining the results of ecoemotionality factor scores versus place of residence, a number of distinct trends can be observed. Taking the factors in turn:

- For ecoemotionality nature secure there is a falling trend, in which urban and rural children are similar, whereas farm children display a far lower score;
- For ecoemotionality nature fearful there is also a falling trend, in which urban children score much more highly than both rural and farm children, who are similar;
- For ecoemotionality nature dismissive there is a rising trend, in which urban and rural children seem broadly similar, whereas farm children display much higher scores.

The MANOVA test revealed that there were significant interactions between place of residence and ecoemotionality factors nature secure (F (2, 256) = 5.27, p <.01), nature fearful (F (2, 256) = 5.39, p <.01) and nature dismissive (F (2, 256) = 9.67, p <.01) (the sum of squares table for this analysis is shown at Appendix 11.3.2.2).

To examine these interactions, the relevant simple effects were calculated. For ecoemotionality nature secure, there were significant differences between place of residence rural and farm (p <.01) and between urban and farm (p <.05). For ecoemotionality nature fearful, there were significant differences between place of residence urban and rural (p <.05) and between rural and farm (p <.05). Finally for ecoemotionality nature dismissive, there were significant differences between place of residence urban and farm (p <.01) and between rural and farm (p <.05).

6.2.1.3 Accessible nature and relative sympathies

The third test was a mixed 2-way MANOVA, with the between subjects independent variable being place of residence (urban, rural) and the within subjects dependent variable being relative sympathy status represented by the three factor scores derived from the relative sympathy scale (environmental, animal, human). The mean values for these three factor scores by attachment status are shown in the following Table.

	Environment Sympathy		Animal Sympathy		Human Sympathy	
	M	SD	M	SD	M	SD
Urban	.16	.96	.00	.88	.16	1.05
Rural	.12	.99	.02	1.12	.10	.94
Farm	-.59	.91	-.02	1.17	-.55	.71

Table 6.15: Childhood residence by relative sympathy factor scores

The MANOVA test revealed significant interactions between place of residence and relative sympathy factors environment (F (2, 283) = 13.92, p <.01), and human (F (2, 283) = 12.18, p <.01) (the sum of squares table for this analysis is shown at Appendix 11.3.2.3).

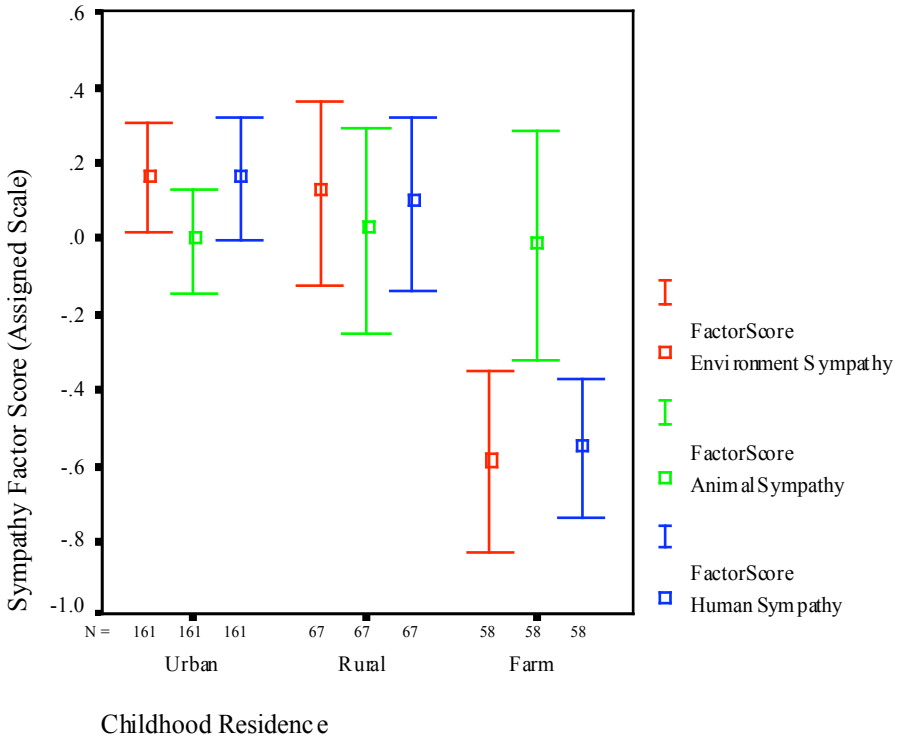


Figure 6.4: Childhood residence versus relative sympathy factor scores

Examining Figure 6.4 reveals a distinct picture. For both relative sympathies environment and human (but, interestingly, not for animal), farm children display far lower scores than both rural and urban children.

To examine these interactions, the relevant simple effects were calculated. For relative sympathy environment, there were significant differences between place of residence urban/rural and farm (for both, p <.01). For relative sympathy human, there were significant differences between place of residence urban/rural and farm (for both, p <.01).

A number of other demographic variables were analysed for possible relationships with accessible nature. The significant relationships were as follows.

6.2.1.4 Accessible nature and education

The highest education level reached by subjects is found to correlate with both absence of nearby 'domesticated' nature ($p < .05$) and having inhabited more urbanised and less 'green' surroundings ($p < .01$).

6.2.1.5 Accessible nature and sample sub-groups

Two of the sample sub-groups had notably less access to gardens than the norm, Electronics and VUB ($p < .01$). In addition, there were significant differences between the sample sub-groups in the rate of presence of a park or woods nearby in childhood ($p < .05$).

As expected, farmers live in greener, more rural environments and tend to have moved home less ($p < .01$).

6.2.2 Exploring nature and attitudes to nature

This second set of tests examined the relationship between the degree to which the subjects played in and explored nature as children (represented by the variables ParkPlay, Wander, Favourite Place, Favourite Place Description, and Explorer) and, by turns, ecoevaluations, ecoemotionality and relative sympathies.

Play and exploration behaviour is taken to be activity that is at least to some extent a voluntary choice made by the child. Clearly, although there is overlap between what parents allow the child to do and what the child actually does, within those parameters the child will in most circumstances be able to exercise a degree of choice.

6.2.2.1 Play and ecoevaluation

The first test used was a mixed 2-way MANOVA, with the between subjects independent variable being frequency of play in nearby parks or woods (never, rarely, sometimes, often) and the within subjects dependent variable being ecoevaluation status represented by the four factor scores derived from the ecoevaluation scale (technocentric, anthropocentric, conservationist, ecocentric). The mean values for these four factor scores by attachment status are shown in the following Table.

	Technocentric		Anthropocentric		Conservationist		Ecocentric	
	M	SD	M	SD	M	SD	M	SD
Never	.18	.68	-.02	.45	.76	1.20	.02	2.15
Rarely	-.43	.87	.13	.94	.28	.91	.09	1.15
Sometimes	-.15	.88	.12	.95	.08	1.14	.05	.94
Often	.06	1.03	-.03	1.02	-.05	.97	-.02	.99

Table 6.16: Play by ecoevaluation factor scores

The MANOVA test revealed that there were no significant interactions between frequency of play and ecoevaluation factors (the sum of squares table for this analysis is shown at Appendix 11.3.2.4).

6.2.2.2 Play and ecoemotionality

The first test used was a mixed 2-way MANOVA, with the between subjects independent variable being frequency of play in nearby parks or woods (never, rarely, sometimes, often) and the within subjects dependent variable being ecoevaluation status represented by the four factor scores derived from the ecoevaluation scale (technocentric, anthropocentric, conservationist, ecocentric). The mean values for these four factor scores by attachment status are shown in the following Table.

	Secure		Fearful		Dismissive		Stoic	
	M	SD	M	SD	M	SD	M	SD
Never	-.75	2.62	1.30	2.12	-.82	.49	-.18	.29
Rarely	-.10	.90	.11	.83	-.31	1.07	-.39	.92
Sometimes	.00	1.17	.40	1.06	-.20	1.04	-.05	.95
Often	.01	.96	-.10	.96	.07	.98	.04	1.02

Table 6.17: Play by ecoemotionality factor scores

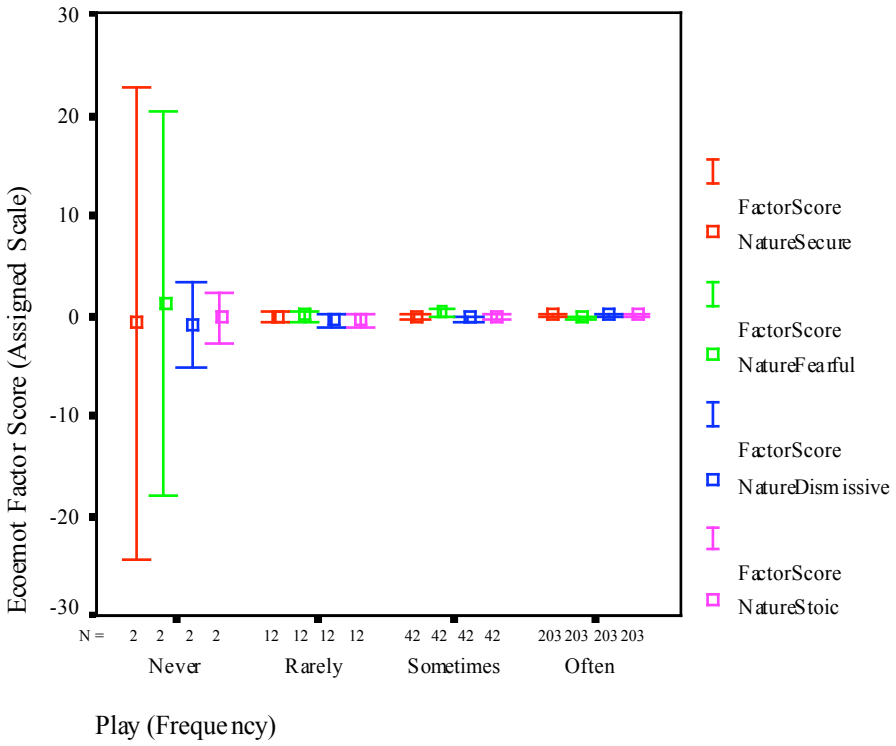


Figure 6.5: Play versus ecoemotionality factor scores

Examining Figure 6.5 it is notable that the confidence intervals for those who never played in nearby nature are markedly greater than all other groups, particularly for factors secure and fearful. This may be artefactual, solely due to the smaller numbers in this group (7) compared to those who played rarely (13), sometimes (53) or often (221), though this would not alone seem satisfactorily to account for the considerably lesser variance among those who never played for the factors dismissive and stoic as against secure and fearful; or it may in part be due to other factors.

The MANOVA test revealed that there was a significant interaction between frequency of play and ecoemotionality nature fearful with F (3, 255) = 4.32, p <.01) (the sum of squares table for this analysis is shown at Appendix 11.3.2.5).

To examine this interaction, the relevant simple effects were calculated. The results showed a significant difference between nature fearful subjects who played in nearby nature sometimes (high) and often (low) (p < .05).

6.2.2.3 Play and relative sympathies

The first test used was a mixed 2-way MANOVA, with the between subjects independent variable being frequency of play in nearby parks or woods (never, rarely, sometimes, often) and the within subjects dependent variable being ecoevaluation status represented by the four factor scores derived from the ecoevaluation scale (technocentric, anthropocentric, conservationist, ecocentric). The mean values for these four factor scores by attachment status are shown in the following Table.

	Environment Sympathy		Animal Sympathy		Human Sympathy	
	M	SD	M	SD	M	SD
Never	.35	1.33	-.68	.14	.42	1.09
Rarely	-.24	.78	.01	.66	.10	1.32
Sometimes	-.05	.96	-.12	.76	.04	1.07
Often	.02	1.01	.05	1.07	-.03	.96

Table 6.18: Play by relative sympathy factor scores

The MANOVA test revealed that there were no significant interactions between frequency of play and relative sympathy factors (the sum of squares table for this analysis is shown at Appendix 11.3.2.6).

6.2.2.4 Wander and ecoevaluation

The first test used was a mixed 2-way MANOVA, with the between subjects independent variable being frequency of play in nearby parks or woods (never, rarely, sometimes, often) and the within subjects dependent variable being ecoevaluation status represented by the four factor scores derived from the ecoevaluation scale (technocentric, anthropocentric, conservationist, ecocentric). The mean values for these four factor scores by attachment status are shown in the following Table.

	Technocentric		Anthropocentric		Conservationist		Ecocentric	
	M	SD	M	SD	M	SD	M	SD
Never	.25	.95	.06	1.03	.03	.98	-.06	1.00
Rarely	-.26	.83	.04	1.03	-.08	.89	.00	.95
Sometimes	.01	.97	.07	.84	.04	.99	.01	1.00
Often	.04	1.09	-.09	1.09	.00	1.07	.01	1.03

Table 6.19: Wander by ecoevaluation factor scores

The MANOVA test revealed no significant interactions between frequency of wander and relative sympathy factors (the sum of squares table is shown at Appendix 11.3.2.7).

6.2.2.5 Wander and ecoemotionality

The first test used was a mixed 2-way MANOVA, with the between subjects independent variable being frequency of wander in nearby parks or woods (never, rarely, sometimes, often) and the within subjects dependent variable being ecoevaluation status represented by the four factor scores derived from the ecoevaluation scale (technocentric, anthropocentric, conservationist, ecocentric). The mean values for these four factor scores by attachment status are shown in the following Table.

	Secure		Fearful		Dismissive		Stoic	
	M	SD	M	SD	M	SD	M	SD
Never	-.44	.94	.06	1.05	.17	.93	-.20	.84
Rarely	-.04	1.02	.37	1.11	-.19	1.01	-.34	.86
Sometimes	.06	1.04	-.09	.94	-.03	1.06	.20	.88
Often	.10	.96	-.11	.95	.05	.97	.05	1.13

Table 6.20: Wander by ecoemotionality factors scores

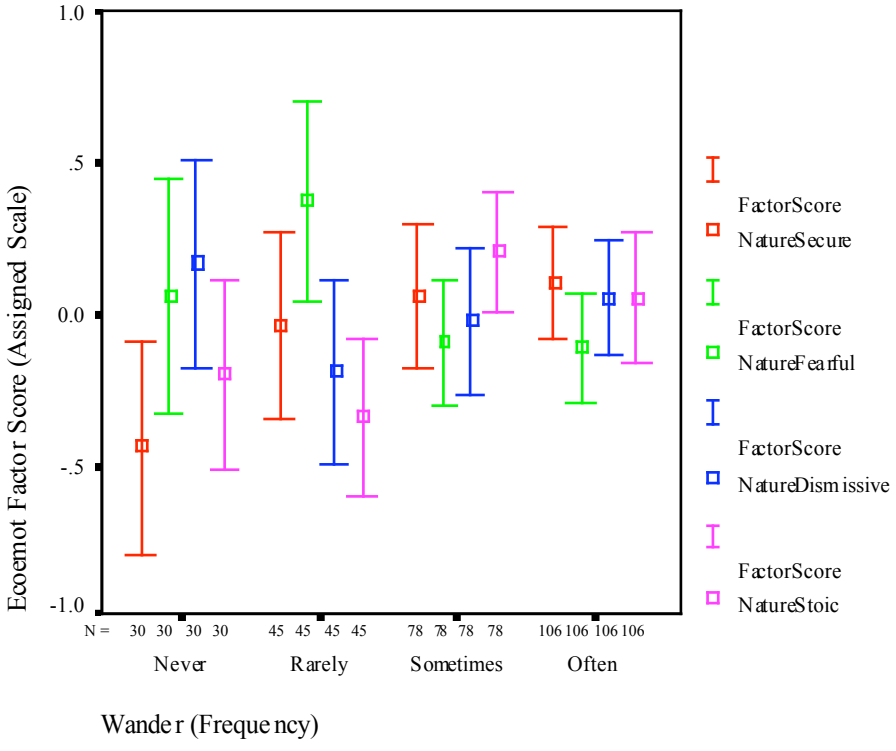


Figure 6.6: Wander versus ecoemotionality factor scores

Most noticeable from Figure 6.6 is the steady rising trend for higher nature secure scores with rising wander frequency. There also appear to be effects for the other three factors where increasing exposure to nearby nature from never to rarely causes the mean value to rise or fall, and greater levels of exposure reverse that trend.

The MANOVA test revealed that there were significant interactions between wander frequency and ecoemotionality factors nature fearful (F (3, 255) = 2.82, p <.05), and nature stoic (F (2, 255) = 3.45, p <.05). Nature secure came close at F (2, 255) = 2.48, p <.061 (the sum of squares table for this analysis is shown at Appendix 11.3.2.8).

To examine these interactions, the relevant simple effects were calculated. For ecoemotionality nature fearful, there was a significant difference between wander frequencies rarely and often (p <.05). For ecoemotionality nature stoic, there was a significant difference between wander frequencies rarely and sometimes (p <.05). Finally for ecoemotionality nature secure, there was a significant difference between wander frequency often and never (p <.05).

6.2.2.6 Wander and relative sympathies

The first test used was a mixed 2-way MANOVA, with the between subjects independent variable being frequency of wander (never, rarely, sometimes, often) and the within subjects dependent variable being ecoevaluation status represented by the four factor scores derived from the ecoevaluation scale (technocentric, anthropocentric, conservationist, ecocentric). The mean values for these four factor scores by attachment status are shown in the following Table.

	Environment Sympathy		Animal Sympathy		Human Sympathy	
	M	SD	M	M	SD	M
Never	-.32	.80	-.03	.75	.25	1.15
Rarely	-.02	.86	.27	1.21	-.06	.93
Sometimes	.07	1.03	-.11	.92	-.04	.99
Often	.05	1.08	-.03	1.01	-.02	.99

Table 6.21: Wander by relative sympathy factor scores

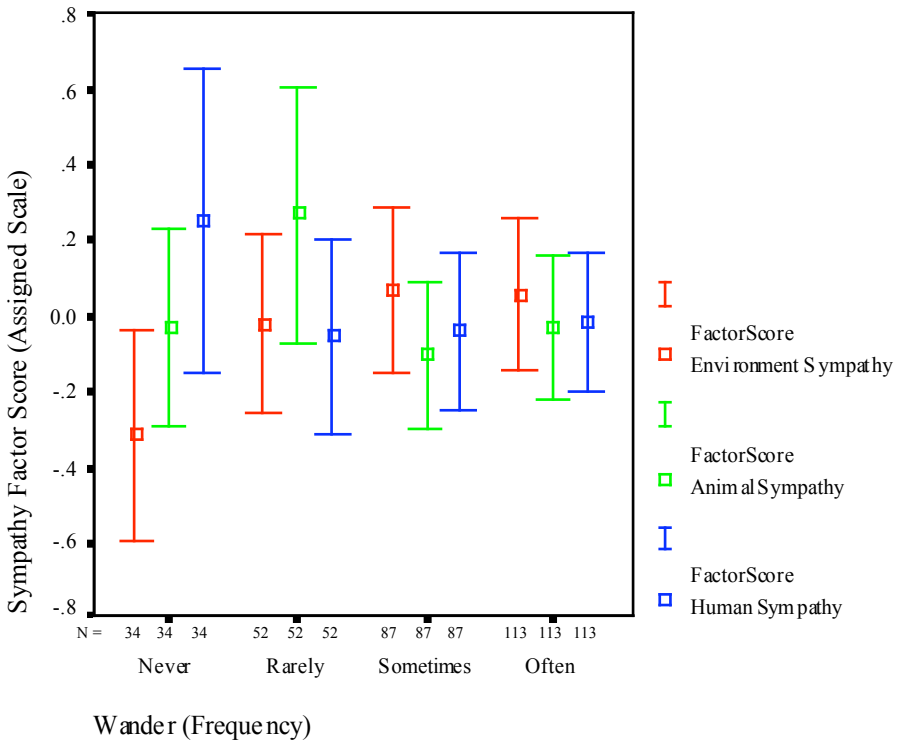


Figure 6.7: Wander versus relative sympathy factor scores

Reviewing Figure 6.7, the principal observable trend appears to be a steady rise in environment sympathy with rising wander frequency. It is also observed that those who never wandered have widely divergent relative sympathies, whereas increasing wander frequencies appear to coincide with increasingly convergent relative sympathies.

The MANOVA test revealed that there were no significant interactions between place of residence and ecoevaluation factors (the sum of squares table for this analysis is shown at Appendix 11.3.2.9).

To examine this interaction, the relevant simple effects were calculated. There was a significant interaction between wander frequency never and relative sympathies ($p < .05$) such that animal sympathy was higher than environmental, and human sympathy greatest.

6.2.2.7 Favourite place and ecoevaluation

This set of tests examined the relationship between having had a favourite place as a child and ecoevaluation factor scores. Favourite place was analysed in three forms: on the basis of a yes/no, and (from participant descriptions, on the basis of content analysis) whether that

place was in nature or not, or near or away from home (see chapter 5 for full derivations of these variables). The first tests were a set of 3, mixed 2-way MANOVAs, with the between subjects independent variables being, respectively, favourite place (yes, no), favourite place (in nature, not in nature), and favourite place (near home, away from home), and the within subjects dependent variable being in each case ecoevaluation status represented by the four factor scores derived from the ecoevaluation scale (technocentric, anthropocentric, conservationist, ecocentric). The mean values for these four factor scores by favourite place variables are shown in the following Table.

		Technocentric		Anthropocentric		Conservationist		Ecocentric	
		M	SD	M	SD	M	SD	M	SD
FavPlace	Favourite place	-.03	1.04	-.09	1.03	.03	1.02	.09	1.00
	No favourite place	.08	.92	.20	.93	-.10	.94	-.17	.96
FavPlace Nature/Not	In nature	-.10	1.02	-.03	1.04	.05	.98	.08	.98
	Not in nature	.40	.87	-.58	.89	-.13	1.41	-.10	1.01
	Unclassifiable	-.92	.	-.18	.	-.20	.	2.20	.
FavPlace Home/Away	Near home	-.19	1.04	-.40	.92	.07	.97	.18	1.07
	Away from home	-.04	.99	.01	1.06	.08	1.01	.04	1.00
	Unclassifiable	.07	1.03	.05	1.04	-.21	1.16	.04	.89

Table 6.22: Favourite place variables by ecoevaluation factor scores

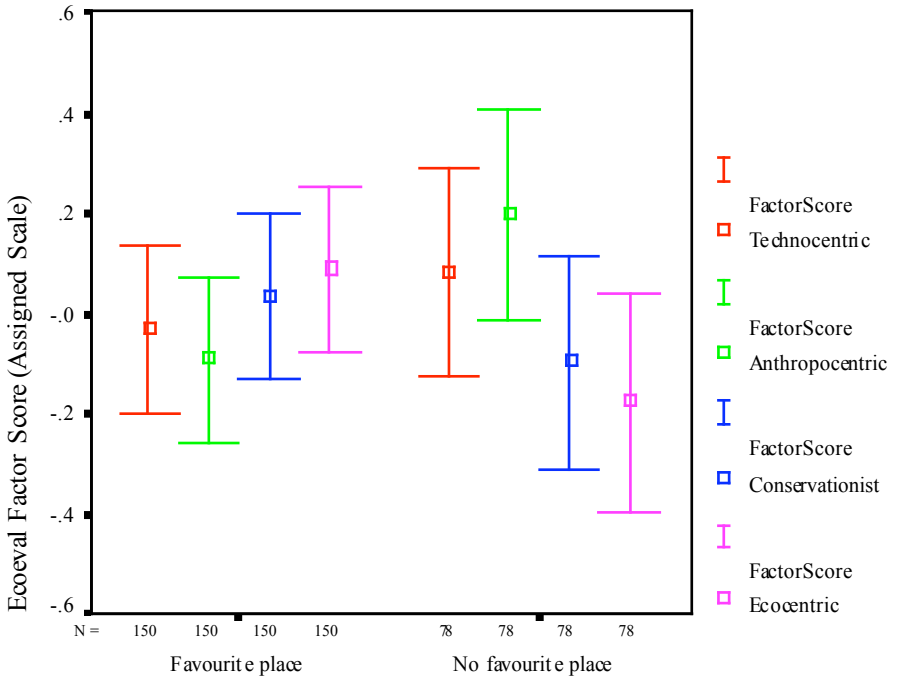


Figure 6.8: Favourite place versus ecoevaluation factor scores

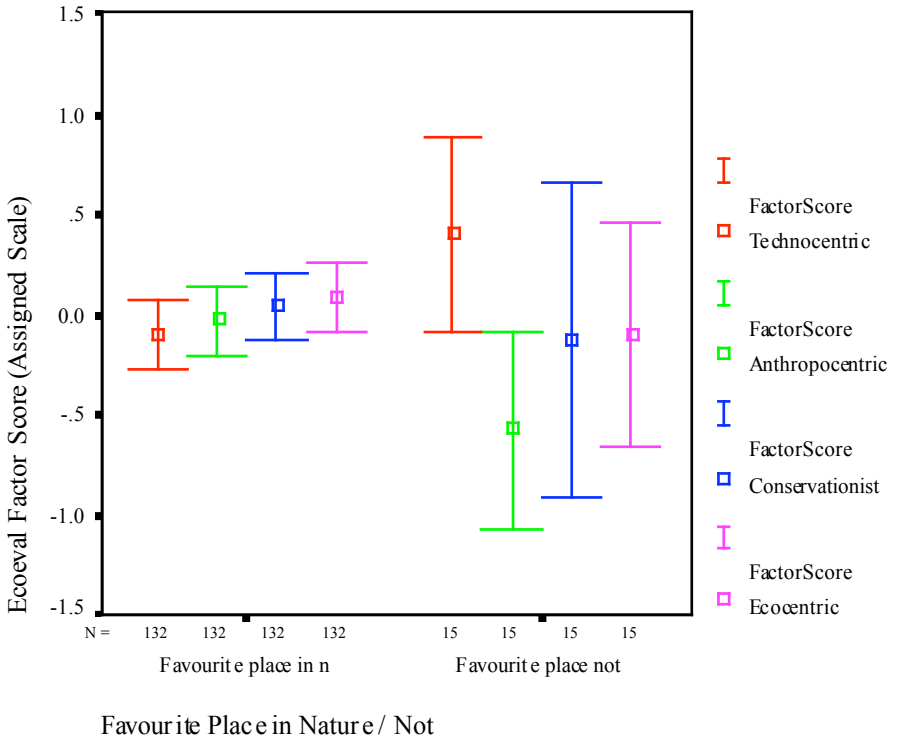


Figure 6.9: Favourite place location versus ecoevaluation factor scores

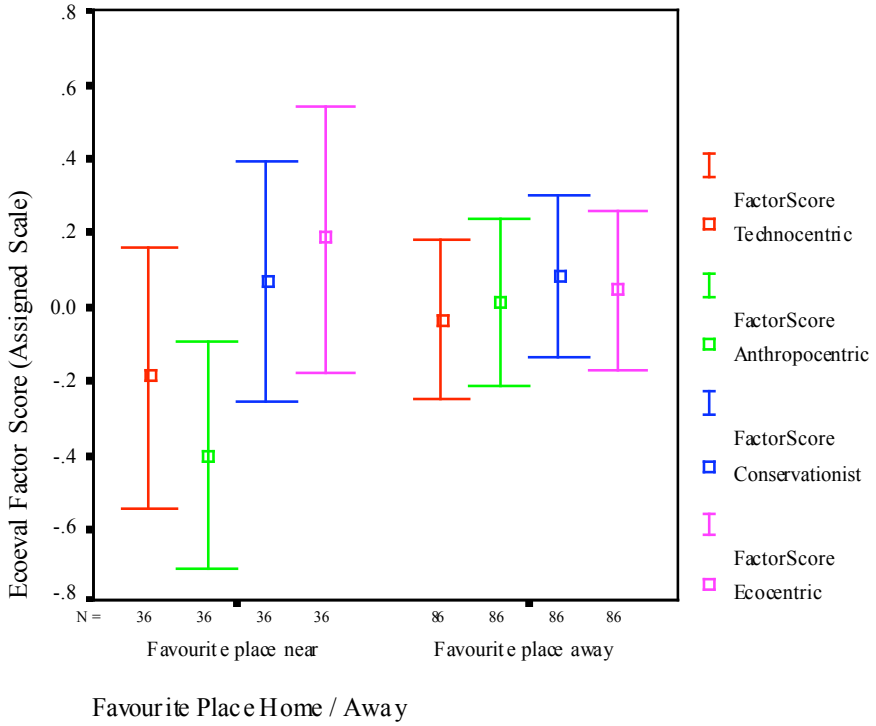


Figure 6.10: Favourite place proximity versus ecoevaluation factor scores

Examining Figure 6.8, Figure 6.9 and Figure 6.10 it is apparent that having a favourite place near home and not in nature is most associated with lowered anthropocentrism, whilst not having had a favourite place, or having had a favourite place that was in nature and away from home, is associated with raised anthropocentrism.

The MANOVA tests revealed that there were significant interactions between favourite place and ecoevaluation factors. Having had a favourite place or not interacted with ecoevaluation factor anthropocentric with $F\ (1, 226) = 4.22$, $p < .05$ (and came close with ecocentric at $p = .058$). Favourite place being in nature or not had no significant interactions with ecoevaluation factors, although anthropocentric came very close at $F\ (1, 145) = 3.88$, $p < .051$. Favourite place being near or away from home also significantly interacted with anthropocentric with $F\ (1, 120) = 4.19$, $p < .05$.

6.2.2.8 Favourite place and ecoemotionality

This set of tests examined the relationship between having had a favourite place as a child and ecoemotionality factor scores. Favourite place was analysed in three forms: on the basis of a yes/no, and (from participant descriptions, on the basis of content analysis) whether that place was in nature or not, or near or away from home (see chapter 5 for full derivations of

these variables). The first tests were a set of 3, mixed 2-way MANOVAs, with the between subjects independent variables being, respectively, favourite place (yes, no), favourite place (in nature, not in nature), and favourite place (near home, away from home), and the within subjects dependent variable being in each case ecoemotionality status represented by the four factor scores derived from the ecoemotionality scale (secure, fearful, dismissive, stoic). The mean values for these factor scores by favourite place variables are shown in Table 6.23.

		Secure		Fearful		Dismissive		Stoic	
		M	SD	M	SD	M	SD	M	SD
FavPlace	Favourite place	.20	.92	.00	.99	-.03	1.00	.01	1.03
	No favourite place	-.46	1.02	.00	1.03	.09	.99	-.05	.92
FavPlace Nature/Not	In nature	.24	.89	-.01	.99	-.08	1.00	.07	1.03
	Not in nature	-.24	1.03	-.05	.97	.19	1.03	-.21	.77
	Unclassifiable	-.88	.	1.34	.	.46	.	-.32	.
FavPlace Home/Away	Near home	-.01	.94	.13	.93	-.51	.90	-.05	.85
	Away from home	.28	.90	.02	1.05	.04	1.02	.08	1.08
	Unclassifiable	.16	.91	-.28	.76	.27	.87	.06	.95

Table 6.23: Favourite place variables by ecoemotionality factors scores

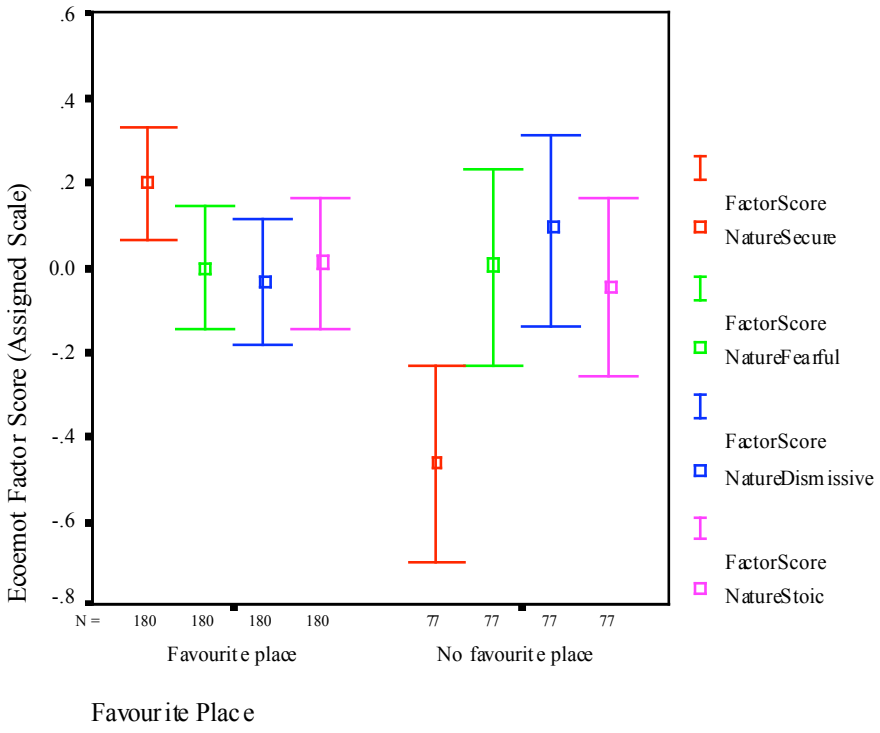


Figure 6.11: Favourite place versus ecoemotionality factor scores

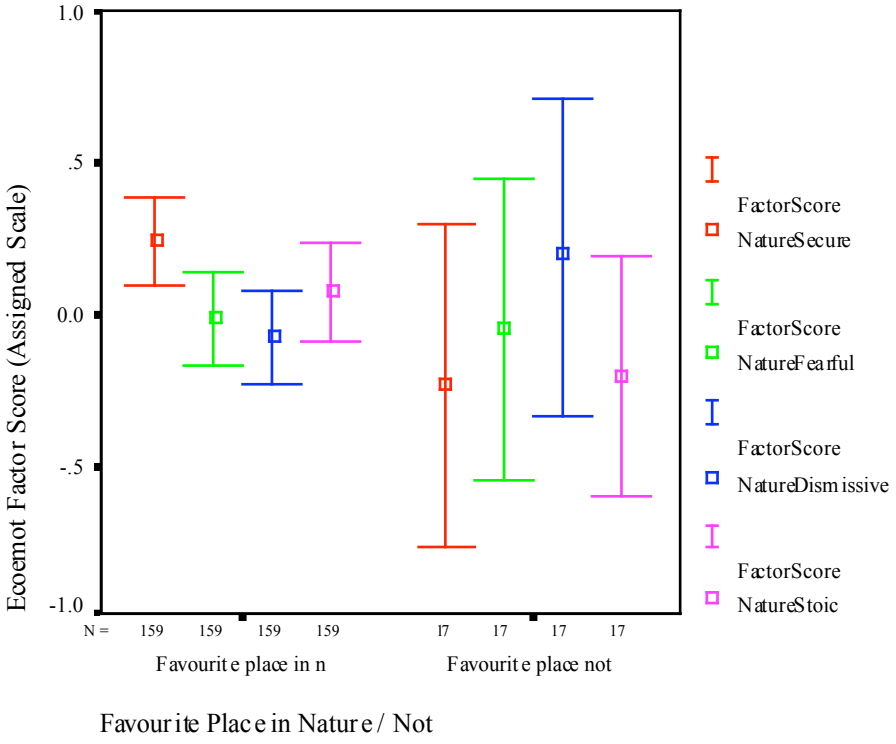


Figure 6.12: Favourite place location versus ecoemotionality factor scores

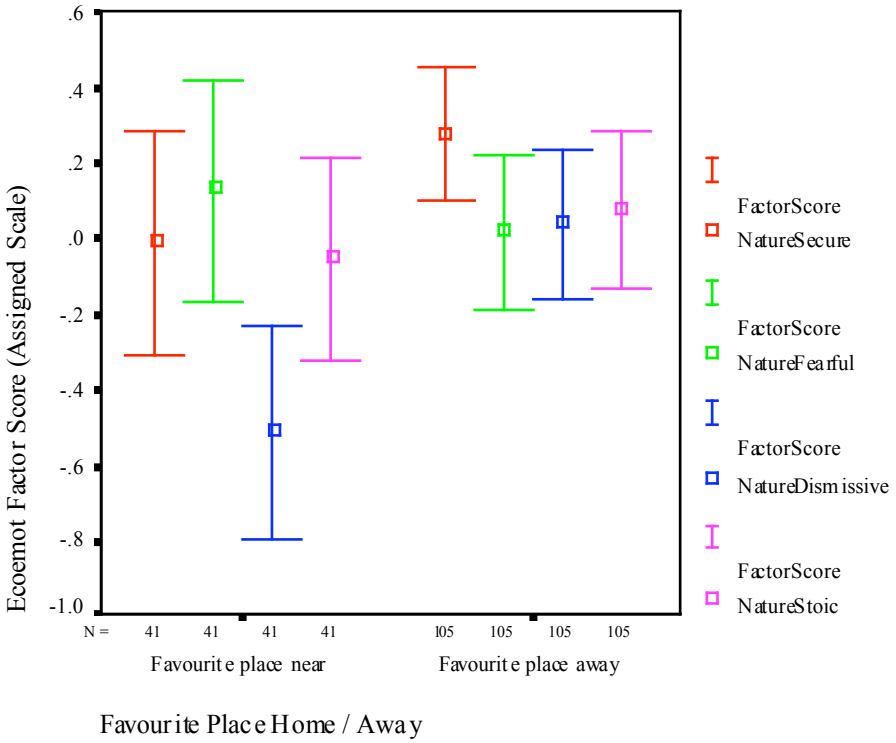


Figure 6.13: Favourite place proximity versus ecoemotionality factor scores

The MANOVA tests revealed that there were significant interactions between favourite place and ecoemotionality factors. Having had a favourite place or not interacted with ecoevaluation factor nature secure with $F(1, 255) = 26.24$, $p < .01$. Favourite place being in nature or not also interacted with ecoevaluation factor nature secure with $F(1, 174) = 4.29$, $p < .05$. Favourite place being near or away from home interacted with ecoevaluation factor nature dismissive with $F(1, 144) = 9.21$, $p < .01$.

Examining Figure 6.11, Figure 6.12 and Figure 6.13, low ecoemotionality factor nature secure relates strongly to not having had a favourite place, and less dramatically to the place not being in nature. Low ecoemotionality nature dismissive relates strongly to having had a favourite place near home.

Some caution must be exercised with regard to the above conclusions which involve distinctions about favourite place since there was an overall strong propensity for favourite places to be in nature (89%) and away from home (72%).

6.2.2.9 Favourite place and relative sympathies

This set of tests examined the relationship between having had a favourite place as a child and relative sympathy factor scores. Favourite place was analysed in three forms: on the basis of a yes/no, and (from participant descriptions, on the basis of content analysis) whether that place was in nature or not, or near or away from home (see chapter 5 for full derivations of these variables). The first tests were a set of 3, mixed 2-way MANOVAs, with the between subjects independent variables being, respectively, favourite place (yes, no), favourite place (in nature, not in nature), and favourite place (near home, away from home), and the within subjects dependent variable being in each case relative sympathy status represented by the four factor scores derived from the relative sympathy scale (human, animal, environment). The mean values for these four factor scores by favourite place variables are shown in the following Table.

		Environment Sympathy		Animal Sympathy	Human Sympathy		
		M	SD	M	M	SD	M
FavPlace	Favourite place	.10	1.02	.01	.91	.03	.99
	No favourite place	-.24	.89	-.04	1.18	-.07	1.04
FavPlace Nature/Not	Favourite place in nature	.13	1.02	.03	.92	.04	.96
	Favourite place not in nature	.02	1.00	-.03	.83	.08	1.23
	Unclassifiable	1.76	.	-.73	.	.54	.
FavPlace Home/Away	Favourite place near home	.13	.88	.21	.92	.07	.88
	Favourite place away from home	.14	1.08	-.02	.92	.00	.99
	Unclassifiable	.07	.99	-.07	.87	.21	1.08

Table 6.24: Favourite place variables by relative sympathy factor scores

The MANOVA tests revealed one interaction: having had a favourite place or not interacted significantly with relative sympathy factor environment with $F(1, 281) = 7.61$, $p < .01$.

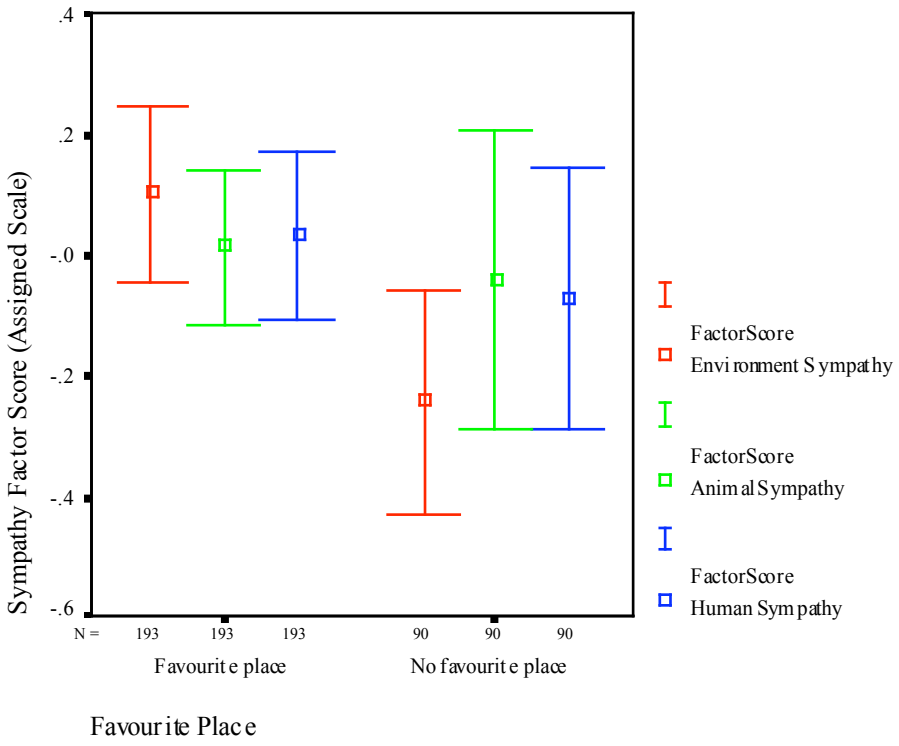


Figure 6.14: Favourite place versus relative sympathy factor scores

Examining Figure 6.14 it is clear that not having had a favourite place relates strongly to lower environment sympathy.

Analyses were also performed for exploratory behaviour versus childhood place and age.

6.2.2.10 Exploring nature and place

This concerns the relationship between the child behaviours of play and wander, and both the child's place and subjects' adult residence.

A univariate ANOVA was performed for frequency of both play and wander versus childhood place, revealing a significant interaction between place and play ($F(3, 277) = 3.82$, $p < .05$), and for play a simple effect between play sometimes and often ($p < .05$), but none for wander. (There was, as would be expected, a significant correlation ($p < .01$) between play and wander: children who play outdoors near home more often are more likely to wander further from home than those who play less outdoors.)

Figure 6.15 reveals a rising trend for play with increasing rurality. Wander behaviour is greater among rural than urban children, decreasing non-significantly among farm children. The trends for play and wander by childhood place (Figure 6.16 and Figure 6.17) are revealing.

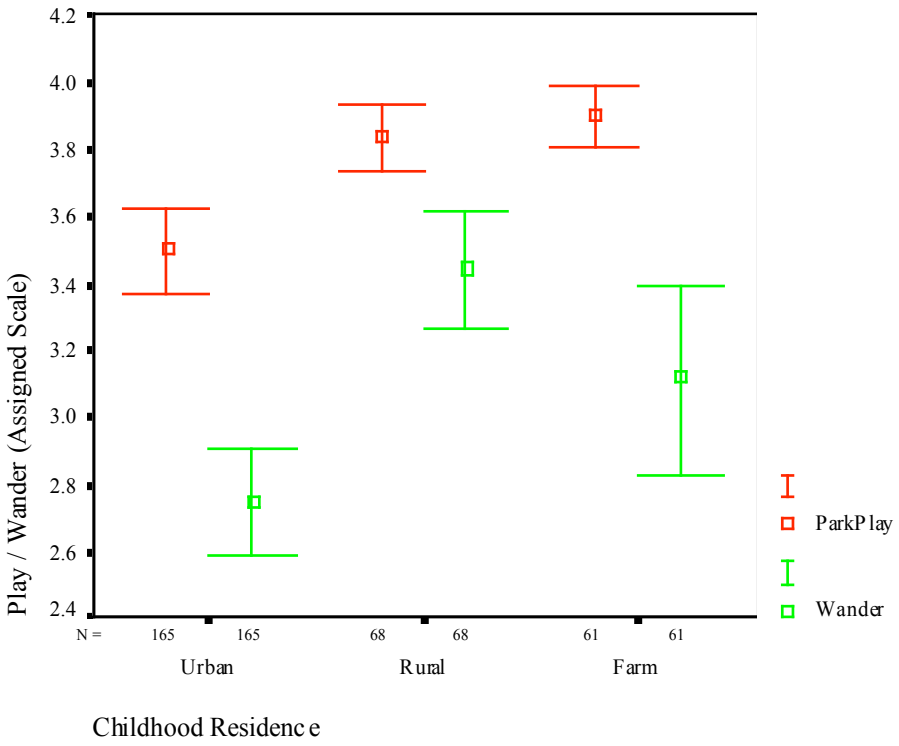


Figure 6.15: Mean play / wander frequency versus childhood residence

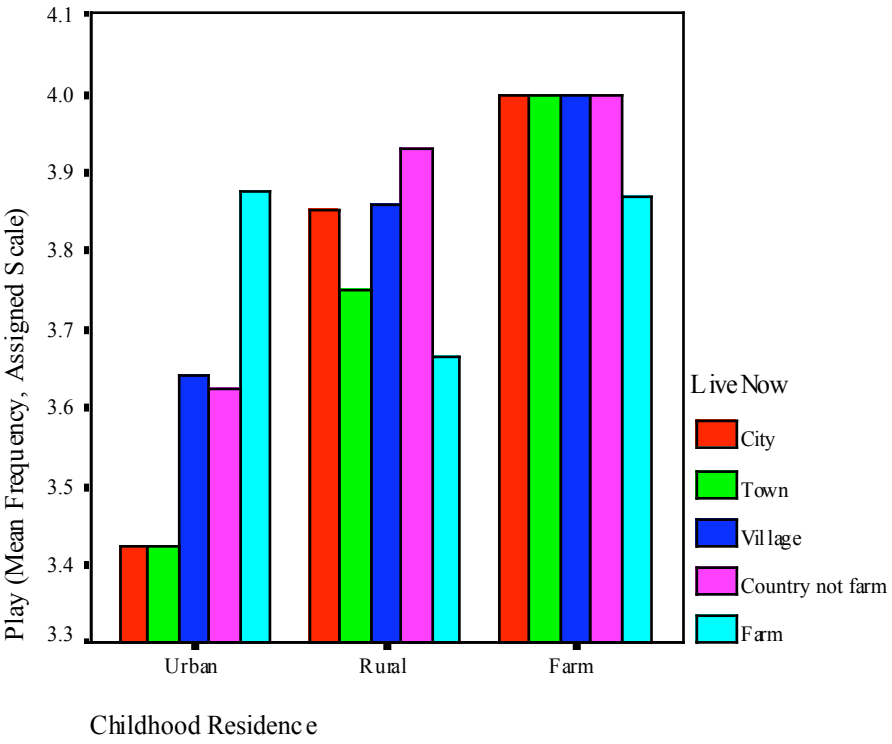


Figure 6.16: Play frequency versus childhood residence, by adult residence

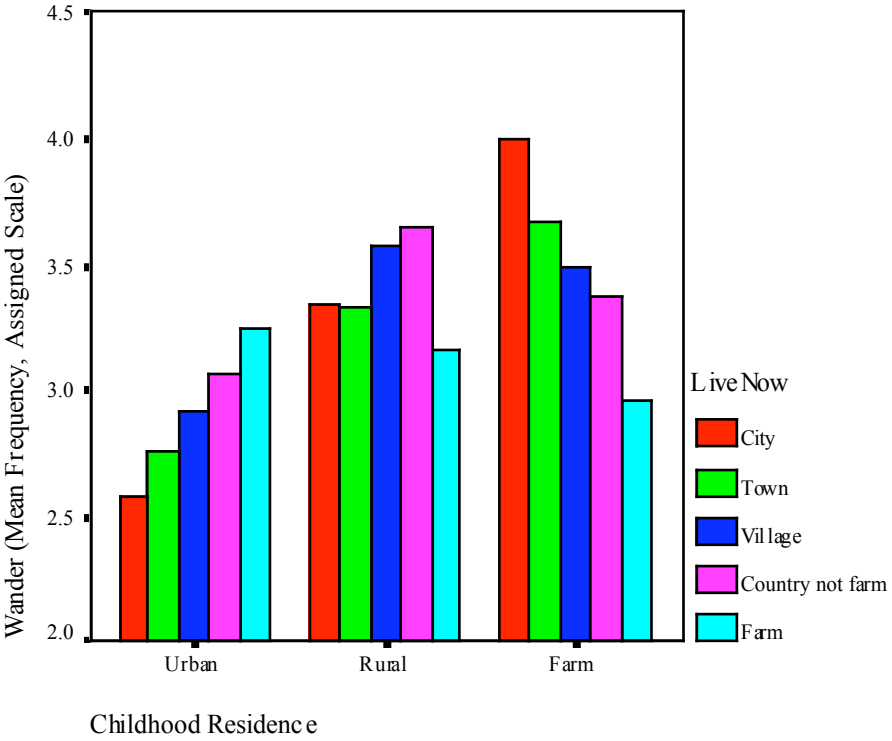


Figure 6.17: Wander frequency versus childhood residence, by adult residence

It appears that the more frequently urban children played in accessible nature, the more likely they are to go on as adults to live in a rural or farm location. Rural children reveal no singular trend. Farm children have almost universally high frequencies of playing outdoors near home, wherever they go on to live as adults.

The pattern appears much the same for wander, with the tendency for urban children who wandered more to go on to live in more rural locations. In this case, however, contrary movement is also indicated in farm children: the more frequently they wandered more than 20 minutes from home, the greater their tendency to move to a more urban location as adults (equally, the less frequently they wandered, the more likely they are to stay on the farm).

6.2.2.11 Exploring nature and age

In ANOVA tests of age band versus childhood play and wander, there were significant differences for play ($F = 2.92$, $p < .05$) and wander ($F = 3.85$, $p < .01$). Against age band, there is a significant correlation ($p < .01$) for wander.

		ParkPlay	Wander
AgeBand	Pearson Correlation	.100	.189
	Sig. (2-tailed)	.085	.001
	N	294	294

Table 6.25: Age band versus play and wander

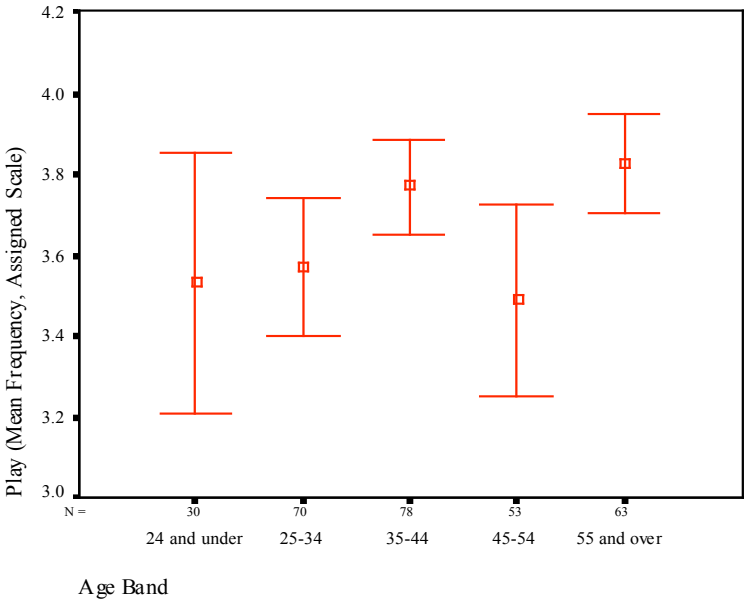


Figure 6.18: Age band versus mean play

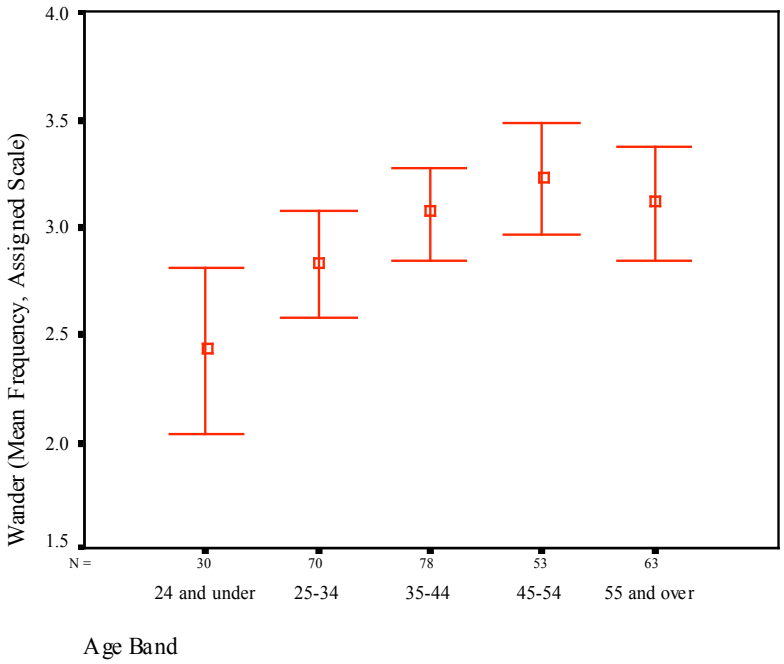


Figure 6.19: Age band versus mean wander

Examination of the figures reveals that there is a trend to more play and wander with greater age, with one exception. Whilst - as expected given progressive urbanization - there appears to be a declining likelihood of playing in accessible nature over the course of the second half of the twentieth century, there is a dip in play for the 45-54 age group (the age cohort most likely to have been young children in the immediate post war years).

6.2.3 Summary of findings

- Significant interaction between place of residence and ecoevaluation factor conservationist. Significant difference for subjects with residence farm between ecoevaluation factor conservationist (low) and technocentric/anthropocentric (high).
- Significant interactions between place of residence and ecoemotionality factors nature secure, nature fearful and nature dismissive.
- For ecoemotionality nature secure there is a falling trend, in which urban and rural children are similar, whereas farm children display a far lower score;

- For ecoemotionality nature fearful there is also a falling trend, in which urban children score much more highly than both rural and farm children, who are similar;
- For ecoemotionality nature dismissive there is a rising trend, in which urban and rural children seem broadly similar, whereas farm children display much higher scores.
- For relative sympathy environment, significant differences between residence urban/rural and farm. For relative sympathy human, significant differences between place of residence urban/rural and farm. For both relative sympathies environment and human, farm children display far lower scores than both rural and urban children.
- Education level reached correlates with both absence of nearby 'domesticated' nature and having inhabited more urbanised, less 'green' surroundings.
- Significant variance between sample sub-groups in terms of access to gardens and presence of a park or woods nearby in childhood.
- Farmers live in greener, more rural environments and tend to have moved home less.
- Significant interaction between play frequency and ecoemotionality nature fearful. Significant difference between fearful subjects who played in nature sometimes (high) and often (low).
- For those with play frequency sometimes, ecoemotionality nature fearful is significantly higher than dismissive.
- Significant interactions between wander frequency and ecoemotionality factors nature fearful, and nature stoic. Nature secure came close ($p < .061$).
- For ecoemotionality nature fearful, significant difference between wander rarely and often. For nature stoic, significant difference between wander rarely and sometimes. For nature secure, significant difference between wander often and never.
- For wander frequency rarely, ecoemotionality nature fearful is significantly higher than stoic.
- Steady rising trend for higher nature secure scores with rising wander frequency.
- Steady rise in environment sympathy with rising wander frequency. Those who never wandered have widely divergent relative sympathies.

- Having had a favourite place or not interacted with ecoevaluation factor anthropocentric (and came close with ecocentric). Favourite place being in nature or not had no significant interactions with ecoevaluation factors, although anthropocentric came close ($p < .051$). Favourite place being near or away from home also significantly interacted with anthropocentric.
- Having a favourite place near home and not in nature is associated with low anthropocentrism; not having had a favourite place, or having had a favourite place that was in nature and away from home, is associated with high anthropocentrism.
- Significant interactions between favourite place and ecoemotionality factors. Having had a favourite place or not interacted with ecoevaluation nature secure. Favourite place being in nature or not also interacted with ecoevaluation nature secure. Favourite place being near or away from home not interacted with ecoevaluation nature dismissive.
- Not having had a favourite place strongly relates to low ecoemotionality nature secure, and slightly less dramatically to the place not being in nature. Low ecoemotionality nature dismissive relates strongly to having had a favourite place near home.
- Having had a favourite place or not interacted significantly with relative sympathy factor environment. Not having had a favourite place relates strongly to lower environment sympathy.
- Favourite place away from home relates to significantly higher maternal overprotection. Higher scores on all factors (both parents), for those with a favourite place away from home.
- No significant relationship between paternal overprotection and either play or wander, though play comes close ($p = .055$). Low overprotection is associated with higher play.
- Children who wander least are most likely as adult to live in a place like their childhood home.
- Nature exploratory behaviour declines throughout the latter half of the 20th century.

6.3 Hypothesis three: Adult attitudes to nature are affected by parental behaviour

The third hypothesis predicted that there would be a relationship between the attitudes to nature held by adult respondents, and the behaviour with respect to nature of their parents.

6.3.1 Parental ecoactivity and attitudes to nature

6.3.1.1 Parental ecoactivity and ecoevaluation

The first test examined the relationship between parental ecoactivity, measured as overall level (categorized by quartiles), and attitudes to nature as represented by ecoevaluation factor scores. The test was a mixed 2-way MANOVA, with the between subjects independent variable being parental ecoactivity category (i.e. inactive, hypoactive, active and hyperactive), and the within subjects dependent variable being ecoevaluation status.

The levels of the ecoevaluation status variable were represented by the four factor scores derived from the ecoevaluation scale (i.e. technocentric, anthropocentric, conservationist, ecocentric). The mean values for these four factor scores by parental ecoactivity category are shown in the following Table.

	Technocentric		Anthropocentric		Conservationist		Ecocentric	
	M	SD	M	SD	M	SD	M	SD
Inactive	.13	.99	.02	1.08	.14	1.01	.06	1.06
Hypoactive	-.12	.97	-.04	.81	-.12	.98	-.11	.98
Active	.11	1.02	-.04	1.15	.01	1.00	-.03	.79
Hyperactive	-.35	1.33	.29	1.42	-.11	1.22	1.09	1.21

Table 6.26: Parental ecoactivity by adult ecoevaluation factor scores

The MANOVA test revealed a significant interaction between parental ecoactivity category and ecoevaluation status ecocentric with $F(3, 225) = 3.30$, $p = > .05$, with simple effects revealing a significant difference between parental ecoactivity category hyperactive and both active and hypoactive, with inactive coming close ($p = .053$) (the sum of squares table for this analysis is shown at Appendix 11.3.3.1).

To further examine the relationship, bivariate correlations were computed for both parental ecoactivity level and parental ecoactivity factor scores (i.e. ecopractical and ecopolitical) versus ecoevaluation factor scores. The results revealed no significant correlations between parental ecoactivity and ecoevaluation factor scores.

6.3.1.2 Parental ecoactivity and ecoemotionality

The second test examined the relationship between parental ecoactivity, measured as an overall level (categorized into quartiles), and attitudes to nature as represented by ecoemotionality factor scores. The test was a mixed 2-way MANOVA, with the between subjects independent variable being parental ecoactivity category (i.e. inactive, hypoactive, active and hyperactive), and the within subjects dependent variable being ecoemotionality status. The levels of the ecoemotionality status variable were represented by the four factor scores derived from the ecoemotionality scale (i.e. nature secure, nature fearful, nature dismissive and nature stoic). The mean values for these four factor scores by parental ecoactivity category are shown in the following Table.

	Secure		Fearful		Dismissive		Stoic	
	M	SD	M	SD	M	SD	M	SD
Inactive	-.16	1.02	.16	1.16	-.03	1.05	-.04	1.08
Hypoactive	-.04	.99	-.15	.81	-.05	.97	.10	.88
Active	.18	.98	.07	1.10	.12	.96	-.09	1.11
Hyperactive	.71	.72	-.07	.68	-.35	.86	-.31	1.14

Table 6.27: Parental ecoactivity by ecoemotionality factor scores

The MANOVA test revealed a significant interaction between parental ecoactivity category and ecoemotionality status nature secure with F (3, 250) = 2.72, p = > .05 (the sum of squares table for this analysis is shown at Appendix 11.3.3.2).

To further examine the relationship, bivariate correlations were computed for both parental ecoactivity level and parental ecoactivity factor scores (i.e. ecopractical and ecopolitical) versus ecoemotionality factors scores. The results showed that there were significant correlations between parental ecoactivity level (p < .01) and parental ecoactivity factor score ecopractical (p < .05) and ecoemotionality factor nature secure.

6.3.1.3 Parental ecoactivity and relative sympathies

The third test examined the relationship between parental ecoactivity, measured as an overall level (categorized into quartiles), and relative sympathies factor scores. The test was a mixed 2-way MANOVA, with the between subjects independent variable being parental ecoactivity category (i.e. inactive, hypoactive, active and hyperactive), and the within subjects dependent variable being relative sympathies status. The levels of the relative sympathies status variable were represented by the three factor scores derived from the relative sympathies scale (i.e. human, animal, environment). The mean values for these three factor scores by parental ecoactivity category are shown in the following Table.

	Environment Sympathy		Animal Sympathy		Human Sympathy	
	M	SD	M	SD	M	SD
Inactive	-.09	.99	-.06	1.03	.03	1.00
Hypoactive	-.01	1.03	-.01	.92	-.03	1.09
Active	.09	.91	.12	1.18	.07	.85
Hyperactive	.59	1.07	.22	.70	-.19	.89

Table 6.28: Parental ecoactivity by relative sympathy factor scores

The MANOVA test revealed that there was no significant interaction between parental ecoactivity category and relative sympathies status (the sum of squares table for this analysis is shown at Appendix 11.3.3.3).

To further examine the relationship, bivariate correlations were computed for both parental ecoactivity level and parental ecoactivity factor scores (i.e. ecopractical and ecopolitical). The results showed that there were no significant correlations between parental ecoactivity and relative sympathies.

6.3.1.4 Other parental ecoactivity-related findings

Scores for parental ecoactivity and adult ecoactivity overall are highly correlated (.305, p <.01) between generations. Correlations between the derived factors are also significant for parental ecopolitical versus adult ecopolitical (.221, $p < .01$), and for parental ecopractical versus adult ecopractical (.279, $p < .01$) but not across factors. MANOVA tests reveal no interactions between overall parental ecoactivity and overall adult ecoactivity scores, but strong interactions between parental ecopractical and adult ecoactivity ($F (3, 247) = 2.78$, $p < .05$), parental ecopractical and adult ecopractical ($F (3, 247) = 2.97$, $p < .05$), and parental ecopolitical and adult ecopolitical ($F (4, 247) = 2.42$, $p < .05$). Calculating the simple effects

reveals that ecopractical is much the more influential parental factor, relating significantly in a variety of ways to adult ecopractical and adult ecopolitical.

Whilst ANOVA tests reveal no significant interaction with adult place of residence (*live now*), the correlations with parental ecopolitical is striking ($p < .01$).

There are significant differences ($p < .05$) in parental ecopractical level with regard to subsequent education level reached. Analysis of simple effects identifies the difference as between post O level (lowest parental ecopractical) and post A level (highest), although examination of the results paints a complex picture, with early school leavers (pre O-level) having relatively highly ecopractical parents, and undergraduate and postgraduate achievers having intermediate parental ecopracticality scores.

Finally, there is a significant ($p < .05$) interaction (using ANOVA) between the frequency of country trips and parental ecopractical score. Analysis of simple effects reveals the difference to be between children taken on country trips rarely and often ($p < .05$), which scores higher on parental ecopractical.

6.3.2 Nature mentoring and attitudes to nature

6.3.2.1 Nature mentor and ecoevaluation

The first test examined the relationship between the nature mentor variable (i.e. yes, no), and attitudes to nature as represented by ecoevaluation factor scores. The test was a mixed 2-way MANOVA, with the between subjects independent variable being presence or absence of a nature mentor, and the within subjects dependent variable being ecoevaluation status. The levels of the ecoevaluation status variable were represented by the four factor scores derived from the ecoevaluation scale (i.e. technocentric, anthropocentric, conservationist, ecocentric). The mean values for these four factor scores by nature mentor are shown in the following Table.

	Technocentric		Anthropocentric		Conservationist		Ecocentric	
	SD	M	SD	M	SD	M	SD	M
Yes	-.04	1.05	.02	1.04	-.05	1.04	.01	1.04
No	.07	.90	-.04	.93	.10	.92	.00	.92

Table 6.29: Nature mentor by adult ecoevaluation factor scores

The MANOVA test revealed that there was no significant interaction between nature mentor and ecoevaluation status (the sum of squares table for this analysis is shown at Appendix 11.3.3.4).

6.3.2.2 Nature mentor and ecoemotionality

The second test examined the relationship between the nature mentor variable (i.e. yes, no), and attitudes to nature as represented by ecoemotionality factor scores. The test was a mixed 2-way ANOVA, with the between subjects independent variable being presence or absence of a nature mentor, and the within subjects independent variable being ecoemotionality status. The levels of the ecoemotionality status variable were represented by the four factor scores derived from the ecoemotionality scale (i.e. nature secure, nature fearful, nature dismissive and nature stoic). The mean values for these four factor scores by nature mentor are shown in the following Table.

	Secure		Fearful		Dismissive		Stoic	
	M	SD	M	SD	M	SD	M	SD
Yes	.09	.98	-.05	.98	-.08	.99	.02	.99
No	-.16	1.03	.08	1.03	.16	1.01	-.03	1.00

Table 6.30: Nature mentor by ecoemotionality factor scores

The ANOVA test revealed that there was no significant interaction between nature mentor and ecoevaluation status. Nature secure came closest at $F(1, 255) = 3.54$, $p = .061$ (the sum of squares table for this analysis is shown at Appendix 11.3.3.5).

6.3.2.3 Nature mentor and relative sympathies

The third test examined the relationship between the nature mentor variable (i.e. yes, no), and relative sympathies factor scores. The test was a mixed 2-way ANOVA, with the between subjects independent variable being presence or absence of a nature mentor, and the within subjects independent variable being relative sympathies status. The levels of the relative sympathies status variable were represented by the three factor scores derived from the relative sympathies scale (i.e. human, animal, environment). The mean values for these three factor scores by nature mentor are shown in the following Table.

	Environment Sympathy		Animal Sympathy		Human Sympathy	
	M	SD	M	M	SD	M
Yes	.06	1.02	.03	1.05	-.11	.88
No	-.12	.95	-.06	.89	.24	1.19

Table 6.31: Nature mentor by relative sympathy factor scores

The ANOVA test revealed that there was a significant interaction between nature mentor and relative sympathies factor human sympathy, with F (1, 282) = 7.85, $p < .01$, such that absence of a nature mentor increases human sympathy (the sum of squares table for this analysis is shown at Appendix 11.3.3.5).

6.3.2.4 Other nature mentor-related findings

There is a correlation between Country Trips and having a Nature Mentor ($p < .01$).

Interestingly, whilst neither the presence of a Nature Mentor nor frequency of Country Trips seems to have a measurable effect on individual Ecoevaluation factor scores, jointly (MANOVA) (a variable otherwise entitled nature mediation) they do with F = (3, 123), $p < .05$. Examination of the results reveals a modest decline in ecoevaluation factor anthropocentrism with increasingly frequent country trips, more clearly where there was no nature mentor.

There is a significant (ANOVA) interaction ($p < .01$) between education level reached according to frequency of country trips. Simple effects reveal significant differences between rare trips and sometimes/often, but the correlation is not significant.

There are two effects for sample sub-groups: firstly, whilst there is no main effect versus nature mediation, there is a simple effect with significant differences among groups between those who had no mentor some trips and those who had mentor some trips ($p < .05$), and, secondly; there is a close to significant interaction between sample sub-group and country trips ($p = .058$), with CHE and economists scoring lowest on frequency of country trips and foresters, biotechnologists and nature quango scoring highest.

6.3.3 Ecoparenting and attitudes to nature

6.3.3.1 Ecoparenting and ecoevaluation

The first test examined the relationship between ecoparenting, categorised as one of four levels, and attitudes to nature as represented by ecoevaluation factor scores. The test was a mixed 2-way MANOVA, with the between subjects independent variable being ecoparenting category (a 2x2 variable combining nature media encouragement and nature mentorship, having values neither/ encourage/ mentor/ both), and the within subjects dependent variable being ecoevaluation status. The levels of the ecoevaluation status variable were represented by the four factor scores derived from the ecoevaluation scale (i.e. technocentric, anthropocentric, conservationist, ecocentric). The mean values for these four factor scores by ecoparenting category are shown in the following Table.

	Technocentric		Anthropocentric		Conservationist		Ecocentric	
	SD	M	SD	M	SD	M	SD	M
Neither	.14	.90	-.03	.97	.16	.90	-.19	.88
Encourage	-.50	.71	-.28	.83	.16	1.04	.25	.81
Mentor	.01	1.08	-.13	1.03	-.10	1.01	.05	1.12
Both	.03	.75	-.09	.88	.13	1.16	-.05	.98

Table 6.32: Ecoparenting by adult ecoevaluation factor scores

The MANOVA test revealed that there was no significant interaction between ecoparenting category and ecoevaluation status (the sum of squares table for this analysis is shown at Appendix 11.3.3.7).

6.3.3.2 Ecoparenting and ecoemotionality

The second test examined the relationship between ecoparenting, categorised as one of four levels, and attitudes to nature as represented by ecoemotionality factor scores. The test was a mixed 2-way MANOVA, with the between subjects independent variable being ecoparenting category (i.e. neither/ encourage/ mentor/ both), and the within subjects dependent variable being ecoemotionality status. The levels of the ecoemotionality status variable were represented by the four factor scores derived from the ecoemotionality scale (i.e. nature secure, nature fearful, nature dismissive and nature stoic). The mean values for these four factor scores by ecoparenting category are shown in the following Table.

	Secure		Fearful		Dismissive		Stoic	
	M	SD	M	SD	M	SD	M	SD
Neither	-.03	1.09	.25	1.12	.23	.93	-.06	.96
Encourage	-.14	1.09	.02	.87	-.44	.96	.04	.91
Mentor	.08	.98	.00	1.08	-.10	1.00	.05	.99
Both	.07	1.03	-.18	.90	-.22	.91	.18	.91

Table 6.33: Ecoparenting by ecoemotionality factor scores

The MANOVA test revealed that there was no significant interaction between ecoparenting category and ecoevaluation status (the sum of squares table for this analysis is shown at Appendix 11.3.3.8).

6.3.3.3 Ecoparenting and relative sympathies

The third test examined the relationship between ecoparenting, categorised as one of four levels, and attitudes to nature as represented by relative sympathies factor scores. The test was a mixed 2-way MANOVA, with the between subjects independent variable being ecoparenting category (i.e. neither/ encourage/ mentor/ both), and the within subjects dependent variable being relative sympathies status. The levels of the relative sympathies status variable were represented by the three factor scores derived from the relative sympathies scale (i.e. human, animal, environment). The mean values for these three factor scores by ecoparenting category are shown in the following Table.

	Environment Sympathy		Animal Sympathy		Human Sympathy	
	M	SD	M	M	SD	M
Neither	.09	1.05	-.09	.83	.03	1.11
Encourage	-.38	.60	.76	1.29	.28	1.01
Mentor	.07	1.02	-.06	.86	-.09	.90
Both	-.02	.82	.70	1.60	.09	.83

Table 6.34: Ecoparenting by relative sympathy factor scores

The MANOVA test revealed that there was a significant interaction between ecoparenting category and relative sympathies factor animal sympathy (the sum of squares table for this analysis is shown at Appendix 11.3.3.9).

To examine this interaction, the relevant simple effects were calculated. The analysis revealed that there were significant differences between the animal sympathy scores for participants who experienced ecoparenting neither and encourage/both, and between mentor and encourage/both. The picture is clarified by examining the figure.

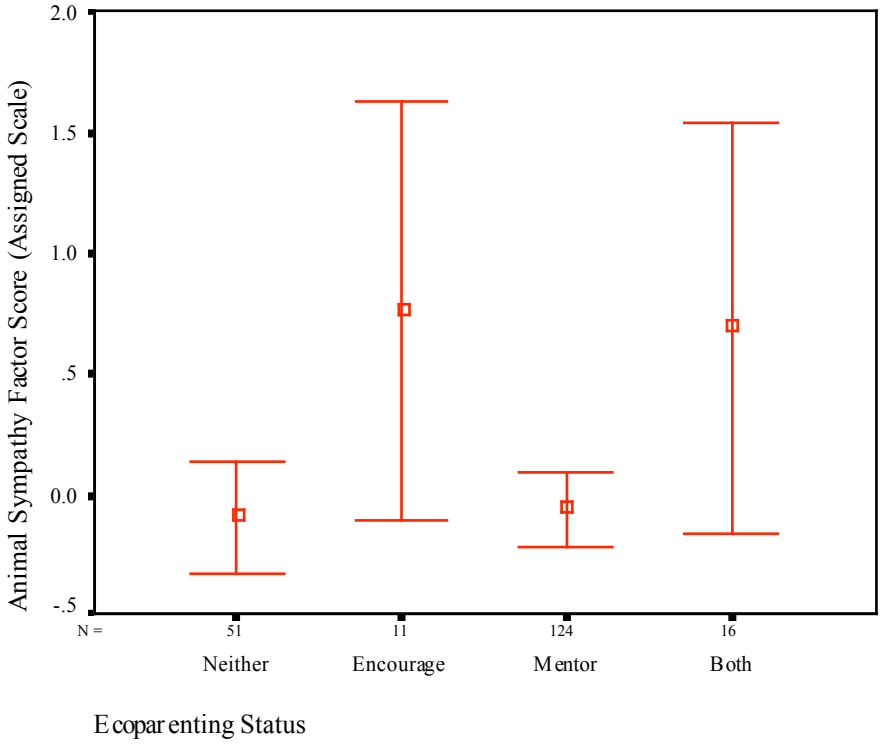


Figure 6.20: Animal sympathy factor score versus ecoparenting category

Children who had neither a nature mentor or nature media encouragement, or experienced only a nature mentor, score low on animal sympathy. Children who had nature media encouragement or both that and a nature mentor score high. The common factor being that nature media encouragement relates to higher animal sympathy score irrespective of nature mentor status.

6.3.3.4 Other ecoparenting-related findings

There is a significant interaction ($p < .01$) between adult social class and ecoparenting but the pattern is not linear. Whilst middle, upper, and unskilled class children receive a moderate degree of ecoparenting, children of skilled manual workers receive much less, and those of semi-skilled workers much more.

Ecoparenting also approaches significance (.067) versus age. 25-34 year olds had a greater degree of ecoparenting than all others.

6.3.4 Summary of findings

- There is a significant interaction between parental ecoactivity category and ecoevaluation status ecocentric, with hyperactive being higher than all others
- There are significant correlations between ecoemotionality factor nature secure and both parental ecoactivity level and parental ecoactivity factor ecopractical.
- Parental ecoactivity and adult ecoactivity are highly correlated between generations, both overall and in terms of the factors ecopractical and ecopolitical. Further analysis reveals that ecopractical is much the more widely influential parental factor.
- Place of residence correlates with rising parental ecopolitical.
- Parental ecopractical interacts in a significant but complex way with regard to subsequent education level reached.
- The more ecopractical the parents, the more children are taken on country trips.
- There was no significant correlation between nature mentor and ecoemotionality, though the presence of a nature mentor came close to significance in raising nature secure ($p = .061$).
- There was increased human sympathy among those without a nature mentor.
- The more a child was taken on country trips, the more likely they are to have had a nature mentor.
- Ecoevaluation factor anthropocentrism declines modestly with increasingly frequent country trips, and does so faster where there was no nature mentor.
- There is a close to significant interaction between sample sub-group and country trips, with CHE and economists scoring lowest on frequency of country trips and foresters, biotechnologists and nature quango scoring highest.
- Nature media encouragement relates to higher animal sympathy score, irrespective of nature mentor status.
- There is a significant interaction between adult social class and ecoparenting but it is hard to see a pattern. Whilst middle, upper, and unskilled class children appear to receive a moderate degree of ecoparenting, children of skilled manual workers receive much less, and those of semi-skilled workers much more.
- Ecoparenting also approaches significance (.067) versus rising age, although those with the greatest absolute degree of ecoparenting were 25-34 year olds.

Chapter 7: Analysis of minor hypotheses

A series of further minor hypotheses were tested using mainly derived variables, to see if further light could be cast on child-nature interaction.

7.1 Hypothesis four: Adult attitudes to nature are affected by indirect and vicarious childhood experience of nature

In order to test this hypothesis, the relationships between, on the one hand, the two attitude to nature scales and the relative sympathies scale and, on the other, the childhood variables describing *nature hobby*, *nature media* and the compound variable *nature child* were employed.

7.1.1 Prevalence of indirect and vicarious nature experience

First, however, the prevalence of favourite nature hobbies reported by this sample. Overall, 62.4% reported having had a childhood nature hobby, of whom 94% pursued it at least sometimes. Breaking hobbies indulged in into categories according to content analysis reveals the picture as in Figure 7.1, below (as before, see chapter 5 for derivation of these variables). Grouping by the most probable domain of experience in Kellert's (1996; 2002) framework leads to the following conclusions:

- 'Direct' nature contact hobbies involving physical contact with primarily non-domesticated nature (fishing/hunting + horse riding + work/exercise) accounted for 41% of pursuants;
- 'Indirect' hobbies involving domesticated nature (gardening) were the preference of 21%, and;
- 'Vicarious' hobbies involving partially abstracted 'nature study' (observe/collect + birdwatching) were the favourite of 33%.

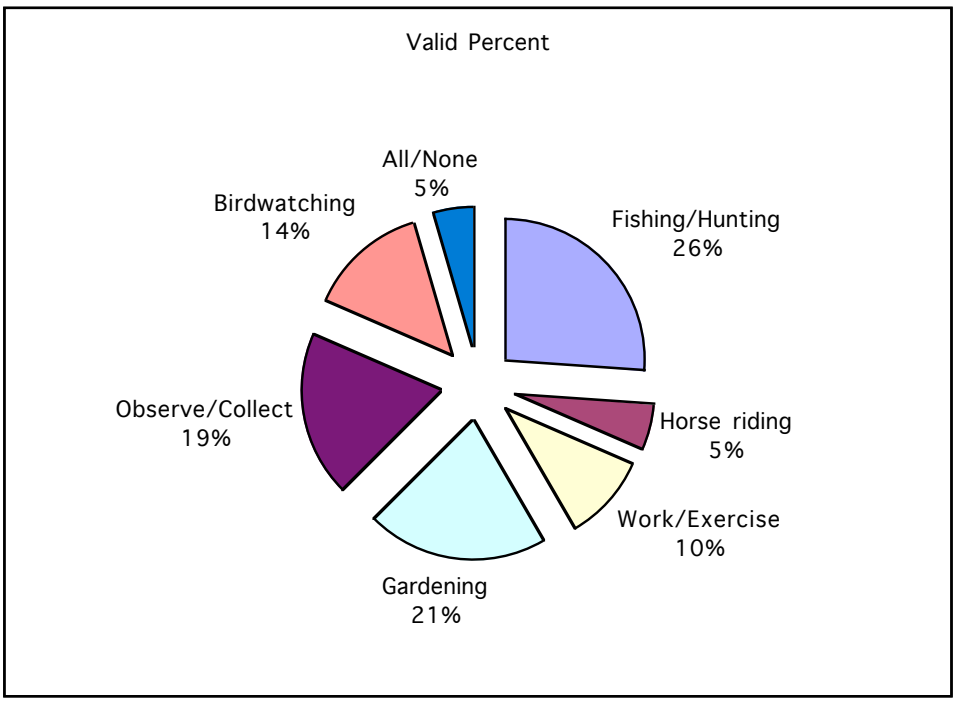


Figure 7.1 Favourite Nature Hobby (First Coder results)

The other measure of children's overt interest in nature gathered was regarding their use of print and broadcast media. Just 9.4% say they never remember reading nature books as children, while 61.5% say they did so sometimes or often. Only 8% never remember listening to radio or watching TV for nature programmes, while 67% did sometimes or often.

A third compound variable was calculated, entitled *nature child*, made up of the presence or absence of a garden, pets and a nature hobby: 89.5% of respondents experienced at least two of these three.

7.1.2 Nature hobbies and attitudes to nature

This set of tests examined the relationship between childhood nature hobbies as represented by the variables *nature hobby* (presence or absence), *hobby frequency* and *favourite hobby* and, by turns, ecoevaluations, ecoemotionality and relative sympathies.

7.1.2.1 Nature hobbies and ecoevaluation

The tests were a series of 3 separate, mixed 2-way MANOVAs, with the between subjects independent variables being *nature hobby* (presence or absence), *hobby frequency,* and *favourite hobby*, and the within subjects dependent variable being ecoevaluation status as represented by the four factor scores derived from the ecoevaluation scale (i.e. technocentric, anthropocentric, conservationist, and ecocentric). The mean values for these four factor scores by hobby variables are shown in the following Table.

		Technocentric		Anthropocentric		Conservationist		Ecocentric	
		M	SD	M	SD	M	SD	M	SD
Hobbies	Nature hobby	-.01	1.02	-.06	1.01	-.05	1.00	.00	1.00
	No nature hobby	.01	1.00	.06	1.00	.05	1.01	.01	1.00
Hobby Freq	Never	.06	.39	1.07	.85	.23	.87	.79	1.33
	Rarely	.17	1.05	-.05	1.20	-.15	1.08	-.16	1.07
	Sometimes	-.17	1.03	-.04	.90	-.08	1.02	-.15	.95
	Often	.10	1.02	-.10	1.09	.03	.99	.17	1.02
Fav Hobby	Gardening	-.29	.98	.18	1.22	-.13	1.21	.36	1.03
	Fishing/ Hunting	.26	1.08	-.26	1.07	.07	.99	.00	1.16
	Birdwatching	.22	.97	-.34	.55	-.45	.91	.09	1.02
	Horse riding	.00	1.20	-.56	.69	-.19	.75	-.09	.54
	Observe/ Collect	-.46	.95	.05	.69	.12	.90	-.18	.83
	Work/ Exercise	.12	1.15	-.06	1.01	.07	1.01	-.16	.96
	All/ None	.15	.40	1.13	1.34	.46	1.03	-.76	.69

Table 7.1: Nature hobbies by ecoevaluation factor scores

The only significant interaction revealed was between *favourite hobby* and ecoevaluation factor *anthropocentric* ($F = 2.35$, $p < .05$) such that the greatest anthropocentrism was exhibited by those with favourite hobby *gardening* (and *all/none*), and the least by those with favourite hobby *horse riding* (the sum of squares table for this analysis is shown at Appendix 11.3.4.1).

7.1.2.2 Nature hobbies and ecoemotionality

The tests were a series of 3 separate, mixed 2-way MANOVAs, with the between subjects independent variables being *nature hobby* (presence or absence), *hobby frequency,* and

favourite hobby, and the within subjects dependent variable being ecoemotionality status as represented by the four factor scores derived from the ecoemotionality scale (i.e. secure, fearful, dismissive, and stoic). The mean values for these four factor scores by hobby variables are shown in the following Table.

		Secure		Fearful		Dismissive		Stoic	
		M	SD	M	SD	M	SD	M	SD
Hobbies	Nature hobby	.14	.96	-.07	.98	.00	1.02	.07	.97
	No nature hobby	-.18	1.03	.13	1.05	.04	.94	-.13	1.06
Hobby Freq	Never	-.37	.95	1.01	.09	.95	.42	-1.25	.62
	Rarely	-.31	1.04	.22	.96	.09	1.45	-.21	1.06
	Sometimes	.10	.87	-.03	.81	-.09	1.03	.12	1.08
	Often	.21	1.03	-.14	1.11	.03	1.01	.03	.87
Fav Hobby	Gardening	.27	.96	.00	1.17	.11	1.15	.06	1.16
	Fishing/ Hunting	.12	.95	-.18	1.14	.04	1.02	.09	.82
	Birdwatching	-.14	1.06	-.29	.74	.08	.89	.12	.87
	Horse riding	-.36	1.19	-.15	.82	-.22	1.05	.37	.64
	Observe/ Collect	.21	.96	.23	.89	-.25	1.11	-.27	1.00
	Work/ Exercise	.46	.77	-.28	.56	-.14	.91	.14	1.05
	All/ None	-.30	.84	.07	.77	.01	1.09	.62	1.20

Table 7.2: Nature hobbies by ecoemotionality factor scores

The only significant interaction revealed was between *nature hobby* and ecoemotionality factor *nature secure* ($F = 5.95$, $p < .05$), those with a nature hobby having a higher nature secure score. Calculation of simple effects revealed no significant differences (the sum of squares table for this analysis is shown at Appendix 11.3.4.2).

7.1.2.3 Nature hobbies and relative sympathies

The tests were a series of 3 separate, mixed 2-way MANOVAs, with the between subjects independent variables being *nature hobby* (presence or absence), *hobby frequency* and *favourite hobby*, and the within subjects dependent variable being relative sympathies status as represented by the four factor scores derived from the relative sympathies scale (i.e. environment, animal, and human). The mean values for these three factor scores by hobby variables are shown in the following Table.

		Environment Sympathy		Animal Sympathy		Human Sympathy	
		M	SD	M	SD	M	SD
Hobbies	Nature hobby	.14	1.05	-.01	1.00	-.09	.94
	No nature hobby	-.22	.84	.06	1.03	.18	1.06
Hobby Freq	Never	-.27	.72	-.38	.63	.95	1.07
	Rarely	-.36	.87	-.46	.57	.25	1.08
	Sometimes	.05	.89	.22	1.13	.03	.95
	Often	.28	1.18	-.19	.85	-.23	.91
Fav Hobby	Gardening	.03	.79	-.01	.81	.09	.95
	Fishing/ Hunting	-.23	.96	-.18	.81	-.11	.87
	Birdwatching	.27	.83	-.30	.62	-.20	1.02
	Horse riding	.50	1.10	.37	1.20	.12	.88
	Observe/ Collect	.21	1.21	.17	1.01	-.18	1.09
	Work/ Exercise	.33	1.09	.16	.95	-.02	.84
	All/ None	.81	1.62	-.70	.28	-.69	.80

Table 7.3: Nature hobbies by relative sympathy factor scores

Significant interactions were revealed between:

- *nature hobby* and relative sympathy factor *environment* ($F = 9.12$, $p < .01$), with the presence of a nature hobby relating to higher environment sympathy;
- *nature hobby* and relative sympathy factor *human* ($F = 4.95$, $p < .05$), with the absence of a nature hobby relating to higher human sympathy scores;
- *hobby frequency* and relative sympathy factor *animal* ($F = 2.96$, $p < .05$), with the simple effects revealing a significant difference between frequency sometimes and often;
- *hobby frequency* and relative sympathy factor *human* ($F = 3.36$, $p < .05$), with the simple effects revealing a significant difference between frequency never and often, a correlation of $p < .01$ and declining human sympathy with increasing hobby frequency;
- *hobby frequency* correlates ($p < .05$) with relative sympathy *environment,* and;
- Close to significance between *favourite hobby* and relative sympathy factor *animal* ($F = 2.15$, $p = .051$).

(the sum of squares table for this analysis is shown at Appendix 11.3.4.3).

7.1.3 Nature media and attitudes to nature

This set of tests examined the relationship between nature media as represented by the variables *read books*, *TV* (presence or absence), and *watch TV* and, by turns, ecoevaluations, ecoemotionality and relative sympathies.

7.1.3.1 Nature media and ecoevaluation

The tests were a series of 3 separate, mixed 2-way MANOVAs, with the between subjects independent variables being *read books*, *TV*, and *watch TV*, and the within subjects dependent variable being ecoevaluation status as represented by the four factor scores derived from the ecoevaluation scale (i.e. technocentric, anthropocentric, conservationist, and ecocentric). The mean values for these four factor scores by nature media variables are shown in the following Table.

		Technocentric		Anthropocentric		Conservationist		Ecocentric	
		M	SD	M	SD	M	SD	M	SD
Read Bks	Never	-.32	1.10	-.03	.82	.25	.93	-.02	.95
	Rarely	-.03	1.02	.13	1.10	.02	1.10	-.04	1.17
	Sometimes	.04	.96	-.05	.87	-.08	.96	.00	.90
	Often	.08	1.07	-.08	1.20	.03	1.00	.02	.97
TV	Television	-.02	1.00	-.14	.92	.03	.99	.00	1.01
	No television	.04	.98	.45	1.13	-.09	1.05	-.07	.91
Watch TV	Never	-.12	.91	.64	1.18	-.11	1.20	.19	.94
	Rarely	.07	.99	.08	.94	.01	.92	-.17	1.05
	Sometimes	-.12	1.01	-.12	.89	.00	.99	.06	1.08
	Often	.16	1.05	-.18	1.13	.10	1.06	.19	.80

Table 7.4: Nature media by ecoevaluation factor scores

The only significant interactions revealed were between:

- *TV* and ecoevaluation factor anthropocentric ($F = 15.41$, $p < .01$), with absence of a television relating to higher anthropocentrism scores;
- *watch TV* and ecoevaluation factor anthropocentric ($F = 3.38$, $p < .05$), with simple effects calculation revealing a significant difference between watch TV never and sometimes/often, and increasing television viewership relates to declining anthropocentrism.

(the sum of squares table for this analysis is shown at Appendix 11.3.4.4).

7.1.3.2 Nature media and ecoemotionality

The tests were a series of 3 separate, mixed 2-way MANOVAs, with the between subjects independent variables being *read books*, *TV*, and *watch TV*, and the within subjects dependent variable being ecoemotionality status as represented by the four factor scores derived from the ecoemotionality scale (i.e. secure, fearful, dismissive, and stoic). The mean values for these four factor scores by nature media variables are shown in the Table below.

		Secure		Fearful		Dismissive		Stoic	
		M	SD	M	SD	M	SD	M	SD
Read Bks	Never	-.39	.70	-.34	.98	-.10	1.16	-.06	1.02
	Rarely	.13	1.04	.04	1.07	.01	1.10	-.07	1.07
	Sometimes	.00	1.02	.03	.91	.03	.88	.00	1.02
	Often	.05	1.02	.03	1.12	-.05	1.03	.09	.85
TV	Television	.00	.99	.03	.99	-.14	.97	.00	1.01
	No television	-.04	1.04	-.09	1.03	.37	.99	.02	1.01
Watch TV	Never	-.13	1.04	-.21	.71	.28	1.11	-.32	.93
	Rarely	-.14	1.08	.12	1.13	.11	1.06	.07	1.12
	Sometimes	-.01	.95	-.03	.96	-.20	.92	.08	.99
	Often	.37	.93	-.01	1.08	.00	1.02	-.10	.87

Table 7.5: Nature media by ecoemotionality factor scores

The significant interactions revealed were between:

- *TV* and ecoemotionality factor *nature dismissive* ($F = 14.20$, $p < .01$), those with a television scoring lower;
- *watch TV* and *TV* and ecoemotionality factor *nature secure* ($F = 2.92$, $p < .05$), with calculation of simple effects showing that the significant difference was between rarely and often, and increasingly frequent nature TV viewing relates to rising nature secure score.

(the sum of squares table for this analysis is shown at Appendix 11.3.4.5).

7.1.3.3 Nature media and relative sympathies

The tests were a series of 3 separate, mixed 2-way MANOVAs, with the between subjects independent variables being *read books*, *TV*, and *watch TV*, and the within subjects dependent variable being relative sympathies status as represented by the four factor scores derived from the relative sympathies scale (i.e. environment, animal, and human). The mean values for these four factor scores by nature media variables are shown in the following Table.

		Environment Sympathy		Animal Sympathy	Human Sympathy		
		M	SD	M	M	SD	M
Read Bks	Never	-.17	1.00	.12	1.41	.22	.95
	Rarely	.02	.98	.00	.95	.07	.99
	Sometimes	-.05	.96	.09	1.02	-.12	.97
	Often	.19	1.08	-.22	.79	.05	1.04
TV	Television	.05	.99	.06	1.01	.01	.96
	No television	-.16	1.00	-.15	.97	-.02	1.14
Watch TV	Never	-.27	.91	-.10	.82	-.44	1.13
	Rarely	.10	1.07	.11	1.38	-.12	.94
	Sometimes	.02	1.02	-.04	.87	.03	.92
	Often	.09	.99	.13	.97	.04	1.01

Table 7.6: Nature media by relative sympathy factor scores

No significant interactions were revealed (the sum of squares table for this analysis is shown at Appendix 11.3.4.6).

7.1.4 Nature child and attitudes to nature

This set of tests examined the relationship between the *nature child* variable (used here as *nature child score*, following a simple recoding into how many of the nature variables garden, pet and hobby the subject registered (i.e. none, one, two, or three) and, by turns, ecoevaluations, ecoemotionality and relative sympathies.

7.1.4.1 Nature child and ecoevaluation

The test was an ANOVA between *nature child score* and ecoevaluation status as represented by the four factor scores derived from the ecoevaluation scale (i.e. technocentric,

anthropocentric, conservationist, and ecocentric). The mean values for these four factor scores by nature child score are shown in the following Table.

		Technocentric		Anthropocentric		Conservationist		Ecocentric	
		SD	M	SD	M	SD	M	SD	M
Nature Child Score	Three	-.04	1.02	-.07	1.01	-.07	1.00	.08	1.01
	Two	.02	.98	-.02	.89	-.02	1.04	-.10	.88
	One	.17	.99	.25	1.20	.07	.93	-.01	1.18
	None	-1.20	.	.60	.	1.26	.	-.63	.

Table 7.7: Nature child score by ecoevaluation factor scores

No significant interactions were revealed (the sum of squares table for this analysis is shown at Appendix 11.3.4.7).

7.1.4.2 Nature child and ecoemotionality

The test was an ANOVA between *nature child score* and ecoemotionality status as represented by the four factor scores derived from the ecoemotionality scale (i.e. secure, fearful, dismissive, and stoic). The mean values for these four factor scores by nature child score are shown in the following Table.

		Secure		Fearful		Dismissive		Stoic	
		M	SD	M	SD	M	SD	M	SD
Nature Child Score	Three	.18	.96	-.05	1.01	.02	1.08	.06	1.00
	Two	-.20	.97	-.07	.88	.03	.84	-.07	.97
	One	-.19	1.09	.39	1.31	.06	1.07	-.02	1.24
	None	-.24	.	1.22	.	-1.07	.	-1.63	.

Table 7.8: Nature child score by ecoemotionality factor scores

The single significant interaction revealed was between *nature child score* and ecoemotionality factor *nature secure* ($F = 3.14$, $p < .05$), nature secure declining with decreasing nature child score (the sum of squares table for this analysis is shown at Appendix 11.3.4.8).

7.1.4.3 Nature child and relative sympathies

The test was an ANOVA between *nature child score* and relative sympathies status as represented by the four factor scores derived from the relative sympathies scale (i.e. environment, animal, and human). The mean values for these three factor scores by nature child score are shown in the following Table.

		Environment Sympathy		Animal Sympathy		Human Sympathy	
		SD	M	M	SD	M	M
Nature Child Score	Three	.12	1.07	.03	1.06	-.06	.93
	Two	-.09	.88	.08	1.05	.10	1.10
	One	-.32	.87	-.32	.50	.15	.95
	None	-1.10	.	-.71	.	-1.08	.

Table 7.9: Nature child score by relative sympathy factor scores

No significant interactions were revealed (the sum of squares table for this analysis is shown at Appendix 11.3.4.9).

7.2 Hypothesis five: Adult attitudes to nature are affected by the size and nature of the animal and human 'menagerie' the child grows up in

7.2.1 Pets and attitudes to nature

This set of tests examined the relationship between childhood pet ownership as represented by the variables *pets* (presence or absence), *number of pet types*, *number of mammal types* and *number of non-mammal types* and, by turns, ecoevaluations, ecoemotionality and relative sympathies.

7.2.1.1 Pets and ecoevaluation

The tests were a series of mixed 2-way MANOVA, with the between subjects independent variables being *pets* (presence or absence), *number of pet types*, *number of mammal types* and *number of non-mammal types* and the within subjects dependent variable being ecoevaluation status as represented by the four factor scores derived from the ecoevaluation scale (i.e. technocentric, anthropocentric, conservationist, and ecocentric). The mean values for these four factor scores by pet variables are shown in the following Table.

		Technocentric		Anthropocentric		Conservationist		Ecocentric	
		M	SD	M	SD	M	SD	M	SD
Pets	Pets	.00	.99	.00	1.01	-.03	1.01	.07	.98
	No pets	.03	.97	.03	.91	.04	.91	-.41	.94
Number of pet types	No pets	.03	.98	.04	1.01	.13	.94	-.40	.91
	One pet type	.03	1.07	.18	1.21	.27	1.10	.15	1.17
	Two pet types	.10	.95	.00	.96	-.15	.90	.06	.96
	Three pet types	-.05	1.01	-.10	.87	-.13	1.06	.10	.98
	Four or more pet types	-.19	1.03	-.13	.94	-.03	.99	-.01	.90
N of mammals	No mammals	.06	.98	.07	.98	.10	1.01	-.26	.94
	One mammal type	-.02	1.03	.10	1.21	.17	.97	.02	1.11
	Two mammal types	.00	.98	-.03	.83	-.20	1.00	.14	.98
	Three mammal types	-.03	1.04	-.22	.88	-.05	1.00	-.01	.85
N of non-mammals	No non-mammals	.04	.98	.01	.99	.01	1.03	-.03	1.03
	One non-mammal type	.07	1.06	.04	1.10	-.07	.95	.12	.91
	Two non-mammal types	-.29	1.01	.04	.92	.03	.94	-.14	.89
	Three or more non-mammal types	-.42	.93	-.74	.49	.13	1.17	.25	1.34

Table 7.10: Pets by ecoevaluation factor scores

The only significant interaction revealed was between *pets* and ecoevaluation factor *ecocentric* ($F(1, 223) = 6.96$, $p < .01$), with pet presence significantly raising ecocentrism (the sum of squares table for this analysis is shown at Appendix 11.3.4.10).

7.2.1.2 Pets and ecoemotionality

The tests were a series of mixed 2-way MANOVA, with the between subjects independent variables being *pets* (presence or absence), *number of pet types*, *number of mammal types* and *number of non-mammal types* and the within subjects dependent variable being ecoemotionality status as represented by the four factor scores derived from the ecoemotionality scale (i.e. secure, fearful, dismissive, and stoic). The mean values for these four factor scores by pet variables are shown in the following Table.

		Secure		Fearful		Dismissive		Stoic	
		M	SD	M	SD	M	SD	M	SD
Pets	Pets	.03	1.00	.00	1.02	.03	1.02	.00	1.01
	No pets	-.26	.93	-.05	.88	-.10	.87	.04	1.05
Number of pet types	No pets	-.20	.95	.00	.88	-.13	.88	.01	1.00
	One pet type	.14	1.11	.23	1.33	-.19	1.18	-.11	1.06
	Two pet types	.03	1.06	.03	1.02	.26	1.01	-.01	1.09
	Three pet types	.00	.91	-.05	.81	.02	.88	.09	.96
	Four or more pet types	-.04	.92	-.30	.69	-.12	.94	.03	.80
N of mammals	No mammals	-.13	.95	-.01	.87	-.13	.87	.09	.96
	One mammal type	.16	1.09	.22	1.29	.05	1.13	-.17	.99
	Two mammal types	-.01	.97	-.06	.81	.03	1.01	.19	1.09
	Three mammal types	-.17	.92	-.31	.70	-.03	.85	-.13	.78
N of non-mammals	No non-mammals	-.02	1.03	-.01	1.01	-.05	1.01	-.03	1.04
	One non-mammal type	-.09	.99	.10	1.12	.21	1.00	.08	1.01
	Two non-mammal types	.23	.88	-.16	.72	.04	.83	.03	.58
	Three or more non-mammal types	.43	.89	-.12	.39	-.92	.80	-.11	1.36

Table 7.11: Pets by ecoemotionality factor scores

The significant interactions revealed were between *number of mammal types* and ecoemotionality factor *nature fearful* ($F(3, 255) = 2.84$, $p < .05$), with simple effects demonstrating a significant difference between one and three mammal types, a negative correlation ($p < .05$) and the figure (below) showing a rise and fall pattern; and between *number of non-mammal types* and ecoemotionality factor *nature dismissive* ($F(3, 255) = 3.10$, $p < .05$), with simple effects demonstrating a significant difference between one and

three non-mammal types and the figure again (below) showing a rise and fall pattern where nature dismissive decreases from one to three non-mammal types (the sum of squares table for this analysis is shown at Appendix 11.3.4.11).

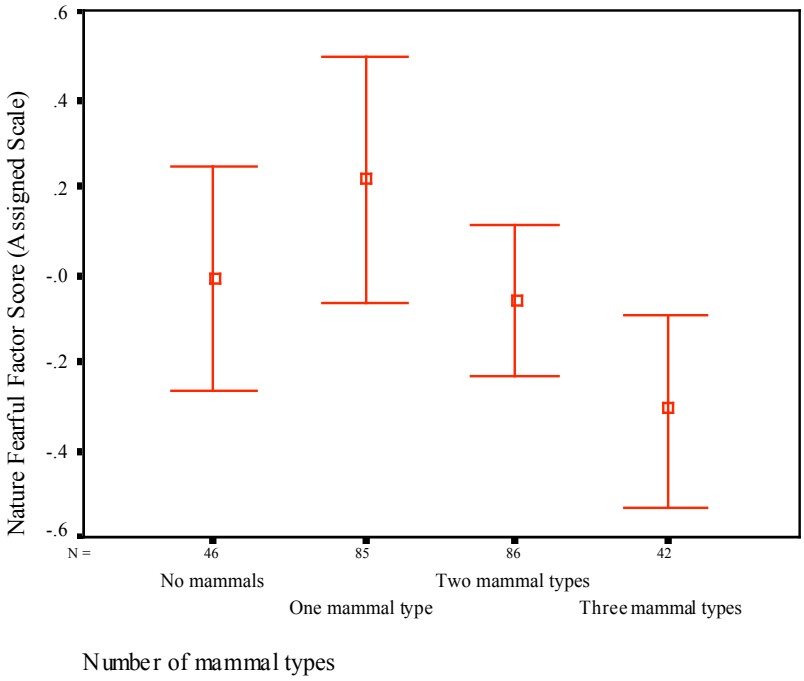


Figure 7.2: Nature fearful factor score versus number of mammal pet types

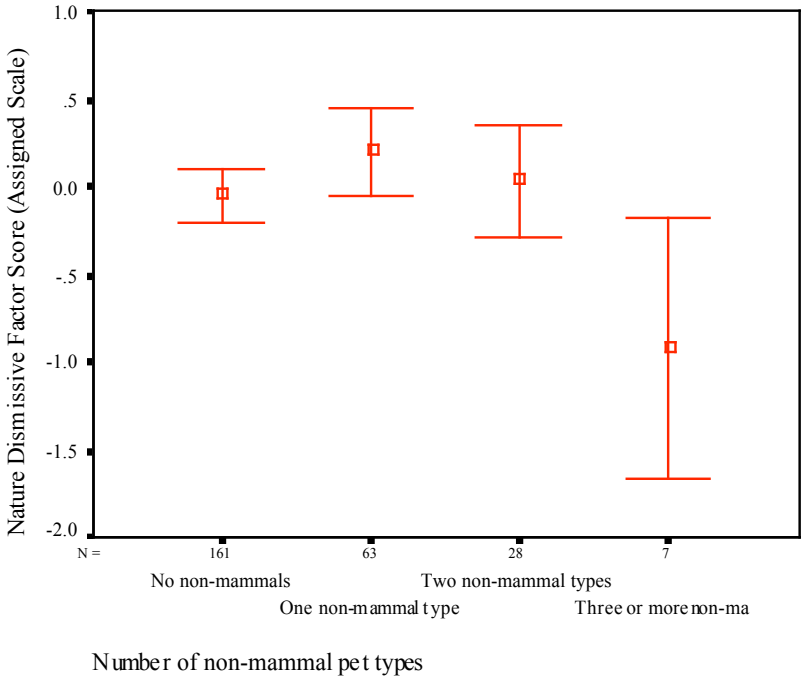


Figure 7.3: Nature dismissive factor score versus number of non-mammal pet types

7.2.1.3 Pets and relative sympathies

The tests were a series of mixed 2-way MANOVA, with the between subjects independent variables being *pets* (presence or absence), *number of pet types*, *number of mammal types* and *number of non-mammal types* and the within subjects dependent variable being relative sympathies status as represented by the four factor scores derived from the relative sympathies scale (i.e. environment, animal, and human). The mean values for these four factor scores by pet variables are shown in the following Table.

		Environment Sympathy		Animal Sympathy		Human Sympathy	
		M	SD	M	M	SD	M
Pets	Pets	-.01	1.00	.05	1.05	.01	.99
	No pets	-.07	.98	-.35	.49	-.03	1.10
Number of pet types	No pets	.02	1.01	-.32	.50	-.04	1.09
	One pet type	-.05	.81	.10	.95	.18	1.09
	Two pet types	-.16	.94	.06	1.11	.04	1.00
	Three pet types	.04	1.05	.00	.88	-.15	.95
	Four or more pet types	.29	1.24	.06	1.32	-.07	.83
N of mammals	No mammals	-.05	.98	-.30	.53	-.04	1.06
	One mammal type	.05	.90	.10	1.05	.14	1.06
	Two mammal types	-.10	.99	-.03	.90	-.04	.94
	Three mammal types	.14	1.24	.19	1.38	-.19	.91
N of non-mammals	No non-mammals	-.03	.95	.04	1.01	.03	1.05
	One non-mammal type	-.18	.97	-.07	1.05	-.02	.98
	Two non-mammal types	.15	1.03	.07	.91	-.09	.82
	Three or more non-mammal types	1.22	1.24	-.40	.61	-.07	.83

Table 7.12: Pets by relative sympathy factor scores

The significant interactions revealed were between *pets* and relative sympathies factor *animal sympathy* ($F (1, 276) = 5.04$, $p < .05$), presence of pets increasing animal sympathy; and between *number of non-mammal types* and relative sympathies factor *environment sympathy* ($F (3, 282) = 6.34$, $p < .01$), with simple effects demonstrating a significant difference between none/one/two non-mammals types and three or more non-mammal types, a positive correlation ($p < .05$) and the figure (below) showing a fall and rise pattern where

environment sympathy falls slightly from none to one non-mammal types then rises (the sum of squares table for this analysis is shown at Appendix 11.3.4.12).

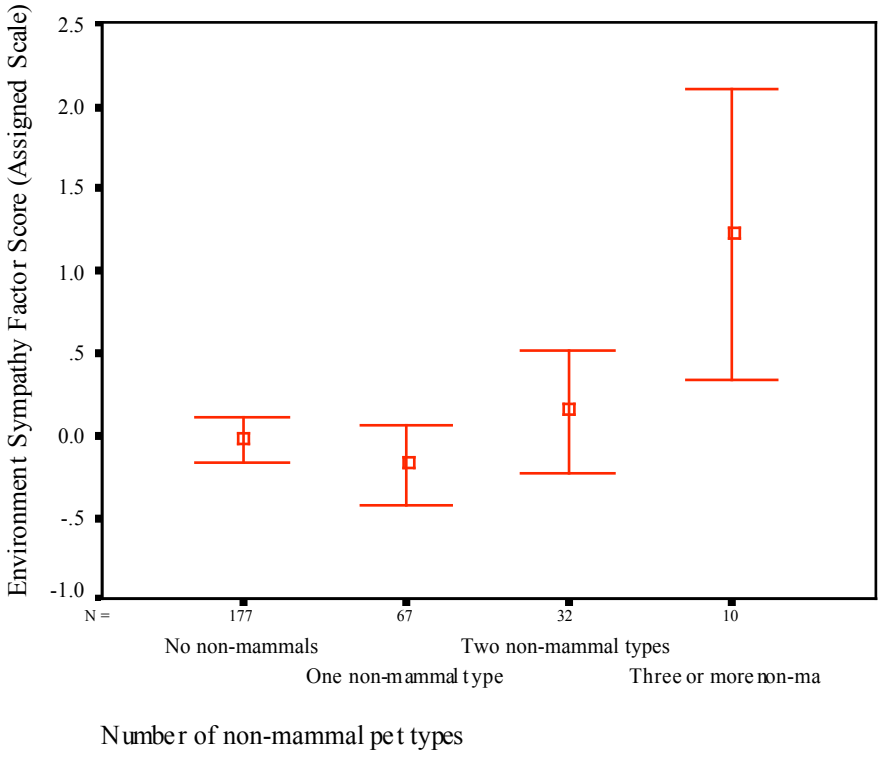


Figure 7.4: Environment sympathy factor score versus number of non-mammal pet types

7.2.1.4 Other pet-related findings

All four pet variables employed correlate individually with each other (< .01).

There is significant variance (< .01) across sample sub-groups for all four pet variables. The only significant difference revealed in simple effects is between CHE and foresters/farmers for number of non-mammal types. Examination of Figure 7.5 shows that the two 'deep green' sample sub-groups, CHE and ecoradicals, had the greatest variety of pet types overall, and economists and electronics the least. Breaking down into types of pets, Figure 7.6 further reveals that whilst CHE and ecoradicals shared high variety in mammal types with farmers, farmers differed in having conspicuously fewer non-mammal pet types. Economists, electronics and foresters had even fewer non-mammal types. Electronics had the least number of mammal types.

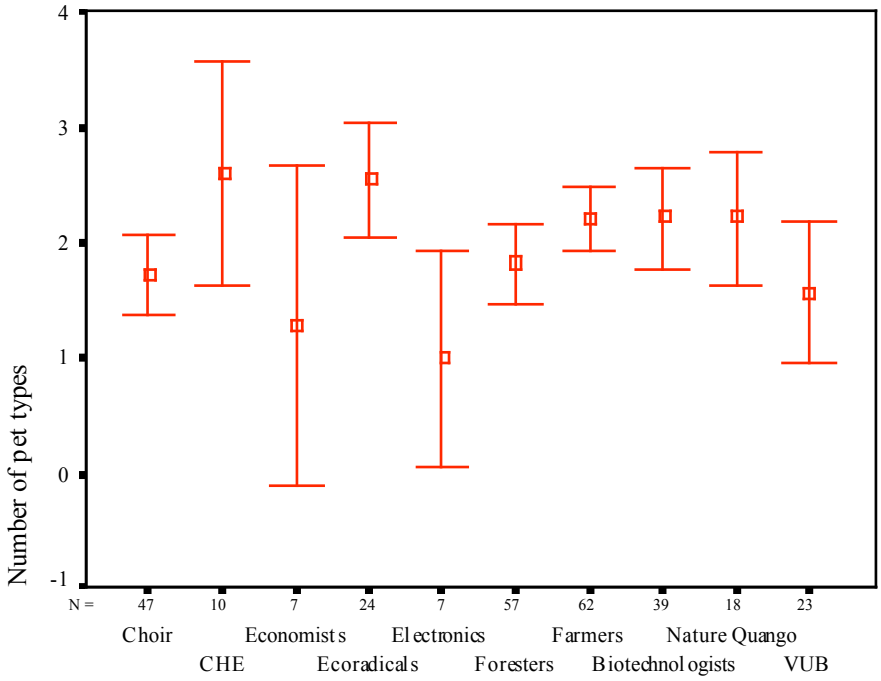


Figure 7.5: Number of pet types versus sample sub-groups

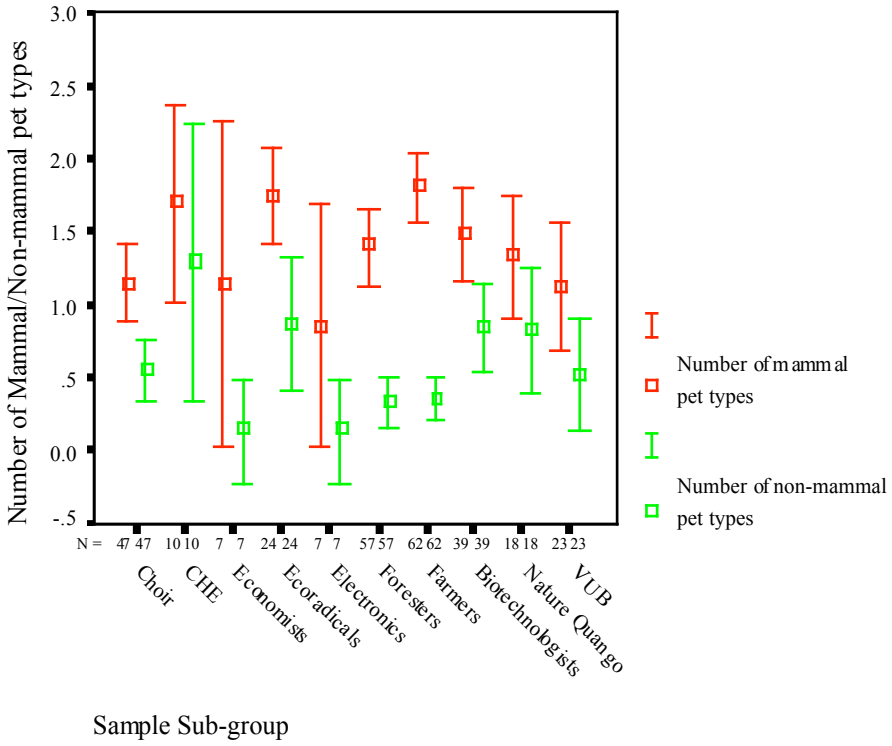


Figure 7.6: Number of mammal and non-mammal pet types versus sample sub-groups

7.2.2 The 'menagerie' and attitudes to nature

This set of tests examined the relationship between numbers of pets-plus-siblings and siblings only as represented by the variables *menagerie* and *siblings* (numbers) and, by turns, ecoevaluations, ecoemotionality and relative sympathies.

7.2.2.1 Menagerie and ecoevaluation

The tests were mixed 2-way MANOVAs, with the between subjects independent variables being *menagerie* and *siblings*, and the within subjects dependent variable being ecoevaluation status as represented by the four factor scores derived from the ecoevaluation scale (i.e. technocentric, anthropocentric, conservationist, and ecocentric). The mean values for these four factor scores are shown in the following Table.

		Technocentric		Anthropocentric		Conservationist		Ecocentric	
		M	SD	M	SD	M	SD	M	SD
Menagerie Index	No pet+sibs	-.62	.88	-.05	1.03	-.39	1.15	-.27	.64
	One pet+sib	.29	1.00	.19	1.04	.10	1.15	-.02	.93
	Two pets+sibs	-.32	1.12	-.14	.93	.24	1.02	-.11	1.03
	Three pets+sibs	.12	.99	-.19	.94	.04	.89	-.25	.96
	Four pets+sibs	.11	.96	-.10	1.01	-.26	1.10	.05	1.04
	Five pets+sibs	-.08	.98	.14	1.17	.05	.88	.11	1.07
	Six pets+sibs	.06	.96	.03	.79	-.23	.81	.38	.94
	Seven or more pets+sibs	-.13	1.03	.20	.97	.10	1.08	-.01	.93
Siblings	None	-.04	1.09	.07	.92	-.32	1.14	-.13	.93
	One	-.03	1.04	-.23	.92	.03	1.05	.10	.98
	Two	-.01	1.05	-.06	.96	-.04	.90	-.19	.93
	Three	.00	.76	.00	1.01	.44	.85	-.21	.94
	Four or more	.09	1.03	.47	1.11	-.23	.95	.35	1.13

Table 7.13: Menagerie and siblings by ecoevaluation factor scores

No significant interaction was evident with *menagerie* but with *siblings*, there were significant interactions with:

- Ecoevaluation factor *anthropocentric* (F (4, 223) = 3.31, $p < .05$), simple effects revealing a significant difference between one and four or more, and a correlation of $p < .01$ demonstrating that rising anthropocentrism relates to increasing sibling numbers;
- Ecoevaluation factor *conservationist* (F (4, 223) = 2.71, $p < .05$), simple effects revealing a significant difference between none and three;
- Ecoevaluation factor *ecocentric* (F (4, 223) = 2.35, $p < .05$).

(the sum of squares table for this analysis is shown at Appendix 11.3.4.13).

7.2.2.2 Menagerie and ecoemotionality

The tests were mixed 2-way MANOVAs, with the between subjects independent variables being *menagerie* and *siblings*, and the within subjects dependent variable being ecoemotionality status as represented by the four factor scores derived from the ecoemotionality scale (i.e. secure, fearful, dismissive, and stoic). The mean values for these four factor scores are shown in the following Table.

		Secure		Fearful		Dismissive		Stoic	
		M	SD	M	SD	M	SD	M	SD
Menagerie Index	No pet+sibs	.21	.73	-.38	.98	.31	.32	-.08	1.20
	One pet+sib	.04	1.03	.11	.89	-.01	1.02	-.26	1.19
	Two pets+sibs	.07	.92	-.03	.86	-.30	1.05	-.07	1.07
	Three pets+sibs	-.22	.99	.08	.87	-.12	1.06	.11	.97
	Four pets+sibs	.08	.98	-.03	1.04	.07	.90	.11	.99
	Five pets+sibs	.15	1.14	.12	1.41	.13	1.20	-.07	.83
	Six pets+sibs	.09	.98	-.21	.76	.25	.82	.04	1.02
	Seven or more pets+sibs	-.20	.91	-.19	.79	.07	.88	.01	1.03
Siblings	None	.24	.78	-.08	.83	.00	1.00	.05	1.31
	One	-.03	.97	.01	.86	-.08	1.01	-.09	.95
	Two	-.02	1.03	-.03	1.02	-.06	.97	.11	.87
	Three	-.21	1.01	-.28	.70	-.05	.98	.02	.95
	Four or more	.15	1.09	.26	1.47	.41	1.00	.03	1.14

Table 7.14: Menagerie and siblings by ecoemotionality factor scores

No significant interactions were evident with either variable (the sum of squares table for this analysis is shown at Appendix 11.3.4.14).

7.2.2.3 Menagerie and relative sympathies

The tests were mixed 2-way MANOVAs, with the between subjects independent variables being *menagerie* and *siblings*, and the within subjects dependent variable being relative sympathies status as represented by the four factor scores derived from the relative sympathies scale (i.e. environment, animal, and human). The mean values for these four factor scores are shown in the following Table.

		Environment Sympathy		Animal Sympathy		Human Sympathy	
		M	SD	M	M	SD	M
Menagerie Index	No pet+sibs	.21	.80	.11	.61	-.42	.75
	One pet+sib	-.15	1.06	-.15	.74	-.34	.86
	Two pets+sibs	-.02	.81	.22	1.29	.10	.97
	Three pets+sibs	-.07	.88	.05	.97	.16	1.04
	Four pets+sibs	-.07	.86	.03	1.12	.07	.98
	Five pets+sibs	.17	1.17	.13	1.02	-.06	1.11
	Six pets+sibs	.09	1.21	-.26	.63	.08	.98
	Seven or more pets+sibs	.03	1.32	-.38	.76	-.27	.88
Siblings	None	-.04	.76	.53	1.65	-.17	.84
	One	-.03	.99	.05	.91	-.04	.97
	Two	.04	1.01	.04	.94	.02	.92
	Three	.08	1.09	-.32	.69	.22	1.09
	Four or more	-.06	1.17	-.31	.72	-.06	1.19

Table 7.15: Menagerie and siblings by relative sympathy factor scores

No significant interaction was evident with *menagerie* but with *siblings*, there was a significant interaction with relative sympathy factor *animal sympathy* ($F(4, 277) = 4.40$, $p < .01$), simple effects establishing a significant difference between none and three/four or more siblings, a negative correlation of $p < .01$, and declining animal sympathy with rising sibling numbers (the sum of squares table for this analysis is shown at Appendix 11.3.4.15).

7.2.2.4 Miscellaneous menagerie-related findings

Whilst there was no significant ANOVA between sample sub-groups and menagerie, compared to other groups, economists and electronics had conspicuously low means.

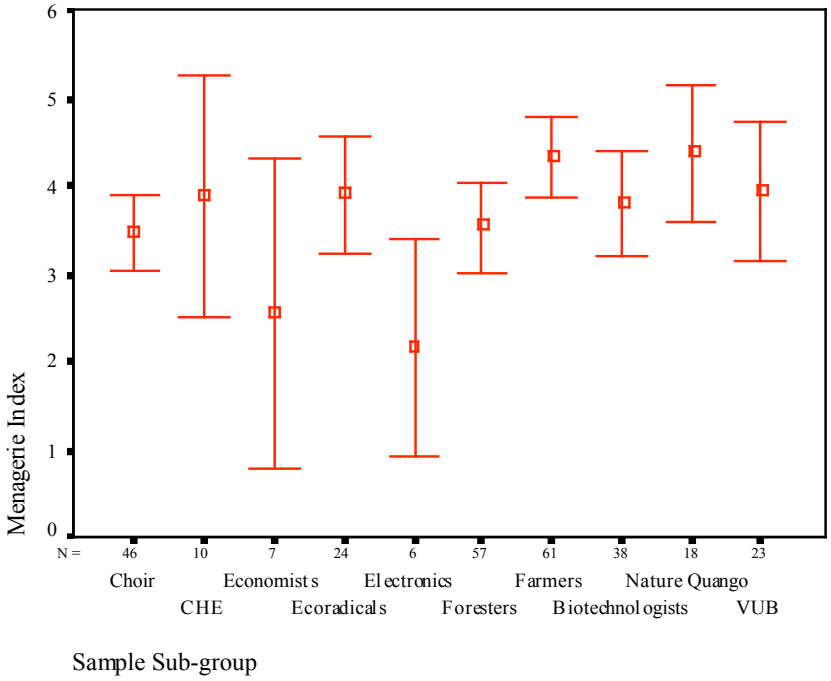


Figure 7.7: Sample sub-group versus menagerie index

Whilst there was no significant ANOVA between *menagerie* and *livenow*, the figure shows a trend toward more rural residence for those with a larger *menagerie* in childhood.

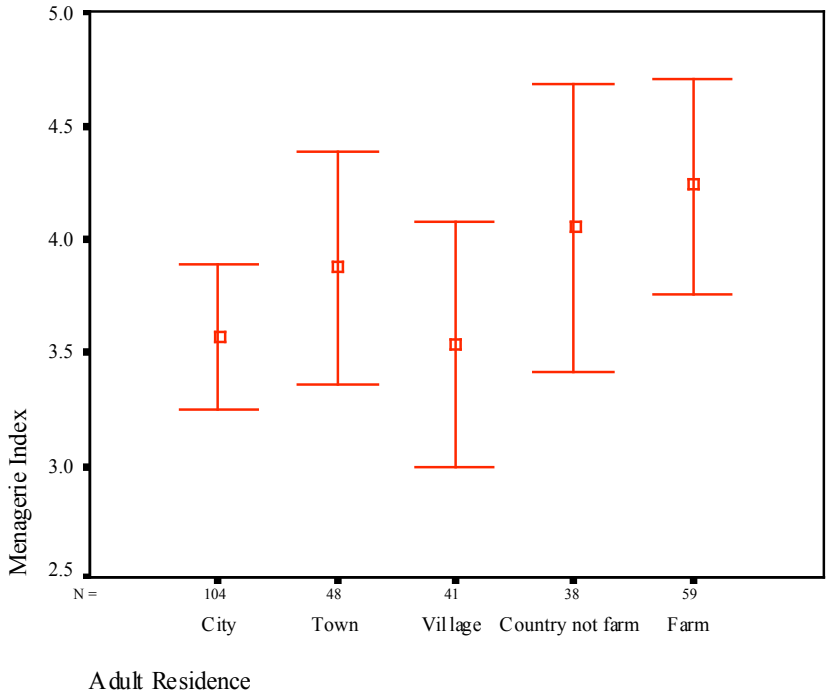


Figure 7.8: Adult residence versus menagerie index

7.3 Hypothesis six: Adult attitudes to nature are affected by social factors

7.3.1 Child movements and attitudes to nature

This set of tests examined the relationship between the number of childhood homes as represented by the variable *child movements* and, by turns, ecoevaluations, ecoemotionality and relative sympathies.

7.3.1.1 Child movements and ecoevaluation

The test was a mixed 2-way MANOVA, with the between subjects independent variable being *child movements* and the within subjects dependent variable being ecoevaluation status as represented by the four factor scores derived from the ecoevaluation scale (i.e. technocentric, anthropocentric, conservationist, and ecocentric). The mean values for these four factor scores are shown in the following Table.

	Technocentric		Anthropocentric		Conservationist		Ecocentric	
	M	SD	M	SD	M	SD	M	SD
One place	.11	.98	.22	1.08	-.02	.95	.07	1.11
Two places	.04	1.00	-.34	.86	.00	1.02	-.18	.86
Three places	-.28	.88	.03	.92	.08	1.17	.06	.78
Four or more places	-.22	1.16	-.16	.85	.11	.98	.02	.98

Table 7.16: Child movements versus ecoevaluation factor scores

The only significant interaction revealed was between *child movements* and ecoevaluation factor *anthropocentric* ($F(3, 225) = 4.53$ $p < .01$), with the significant difference being between one and two places and a negative correlation. There was also a negative correlation for ecoevaluation factor technocentric, both factors declining as shown in the figure below with numbers of moves (the sum of squares table for this analysis is shown at Appendix 11.3.4.16).

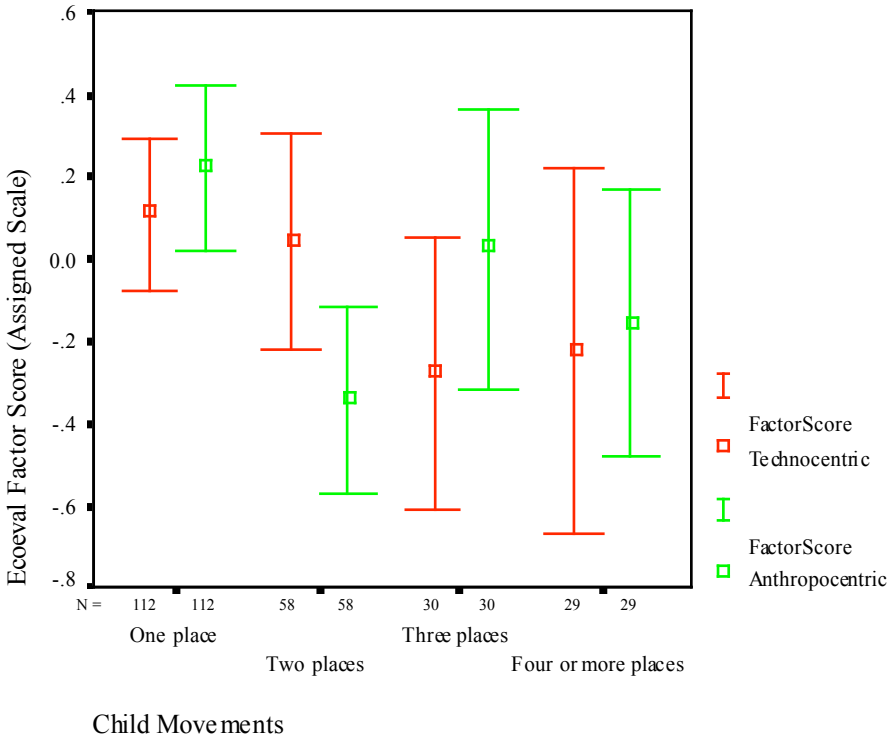


Figure 7.9: Child movement versus ecoevaluation factor scores

7.3.1.2 Child movements and ecoemotionality

The test was a mixed 2-way MANOVA, with the between subjects independent variable being *child movements* and the within subjects dependent variable being ecoemotionality status as represented by the four factor scores derived from the ecoemotionality scale (i.e. secure, fearful, dismissive, and stoic). The mean values for these four factor scores are shown in the following Table.

	Secure		Fearful		Dismissive		Stoic	
	M	SD	M	SD	M	SD	M	SD
One place	-.01	1.07	.11	1.20	.22	.97	.11	1.03
Two places	.09	.98	-.26	.74	-.14	1.00	-.16	1.01
Three places	-.01	.86	-.01	.79	-.13	1.09	-.03	.95
Four or more places	-.12	.95	.13	.74	-.43	.87	-.11	.87

Table 7.17: Child movements by ecoemotionality factor scores

The only significant interaction revealed was with ecoemotionality factor score *dismissive* ($F(3, 252) = 4.84$, $p < .01$), with simple effects demonstrating a significant difference between one and four or more places, and a significant negative correlation such that

increasing numbers of *child movements* relate to declining nature *dismissive* (the sum of squares table for this analysis is shown at Appendix 11.3.4.17).

7.3.1.3 Child movements and relative sympathies

The test was a mixed 2-way MANOVA, with the between subjects independent variable being *child movements* and the within subjects dependent variable being relative sympathies status as represented by the four factor scores derived from the relative sympathies scale (i.e. environment, animal, and human). The mean values for these four factor scores are shown in the following Table.

	Environment Sympathy		Animal Sympathy		Human Sympathy	
	M	SD	M	M	SD	M
One place	-.16	1.00	-.01	1.05	-.07	.97
Two places	.09	1.01	-.17	.76	.08	1.13
Three places	.18	.92	.44	1.36	.18	.86
Four or more places	.27	1.04	-.02	.78	-.08	.97

Table 7.18: Child movements by relative sympathy factor scores

The significant interaction revealed was between *child movements* and relative sympathies factor *animal sympathy* ($F(3, 279) = 3.08$, $p < .05$), with simple effects showing the significant difference between two and three places. Factor score *environment sympathy* was however close ($p = .054$), and had a significant ($p < .01$) positive correlation (the sum of squares table for this analysis is shown at Appendix 11.3.4.18).

7.3.1.4 Other social factors-related findings

There is a highly significant correlation between education level and number of child movements $F = 4.50$, $p < .01$, and a positive correlation ($p < .01$) such that those who moved more reach higher levels of formal educational attainment.

7.3.2 Social class and attitudes to nature

This set of tests examined the relationship between the social class of respondents in childhood as represented (as has been the somewhat sexist convention until very recently) by the father's social class (variable *dad class)* and, by turns, ecoevaluations, ecoemotionality and relative sympathies.

7.3.2.1 Social class and ecoevaluation

The test was a mixed 2-way MANOVA, with the between subjects independent variable being *dad class* and the within subjects dependent variable being ecoevaluation status as represented by the four factor scores derived from the ecoevaluation scale (i.e. technocentric, anthropocentric, conservationist, and ecocentric). The mean values for these four factor scores by social class are shown in the following Table.

	Technocentric		Anthropocentric		Conservationist		Ecocentric	
	M	SD	M	SD	M	SD	M	SD
No reply	-.11	.87	.19	.65	-.33	.99	-.53	.75
Professional	-.14	.88	-.11	1.05	-.10	1.07	.05	.83
Managerial/ technical	.07	.98	-.04	.96	.03	.98	-.09	1.03
Skilled manual	.43	.95	.25	.99	.00	.87	.32	1.09
Skilled non-manual	-.21	1.18	-.04	1.05	.03	1.14	.18	.98
Semi-skilled	-.29	.84	-.21	.78	.50	.89	-.17	1.31
Unskilled	-.66	1.61	.50	1.57	.09	1.07	.18	1.27

Table 7.19: Social class by ecoevaluation factor scores

There were no significant interactions (the sum of squares table for this analysis is shown at Appendix 11.3.4.19).

7.3.2.2 Social class and ecoemotionality

The test was a mixed 2-way MANOVA, with the between subjects independent variable being *dad class* and the within subjects dependent variable being ecoemotionality status as represented by the four factor scores derived from the ecoemotionality scale (i.e. secure, fearful, dismissive, and stoic). The mean values for these four factor scores by social class are shown in the following Table.

	Secure		Fearful		Dismissive		Stoic	
	M	SD	M	SD	M	SD	M	SD
No reply	-.53	.82	-.38	.45	.21	.72	.14	.66
Professional	.08	.90	-.01	.86	-.12	.97	-.16	.83
Managerial/ technical	-.08	1.01	-.12	.92	.15	1.00	-.02	1.07
Skilled manual	.10	1.08	.27	1.30	-.07	.99	.20	1.12
Skilled non-manual	.03	1.12	.08	.97	-.24	1.03	.17	.75
Semi-skilled	-.01	.58	.27	.91	-.51	.64	-.17	1.43
Unskilled	.84	1.07	.73	1.88	-.17	1.41	.10	1.00

There were no significant interactions revealed. There was however a significant correlation (< .05) between factor score *nature fearful* and social class, as shown in Figure 7.10, such that nature *fearful* is higher among the lower social class groups (the sum of squares table for this analysis is shown at Appendix 11.3.4.20).

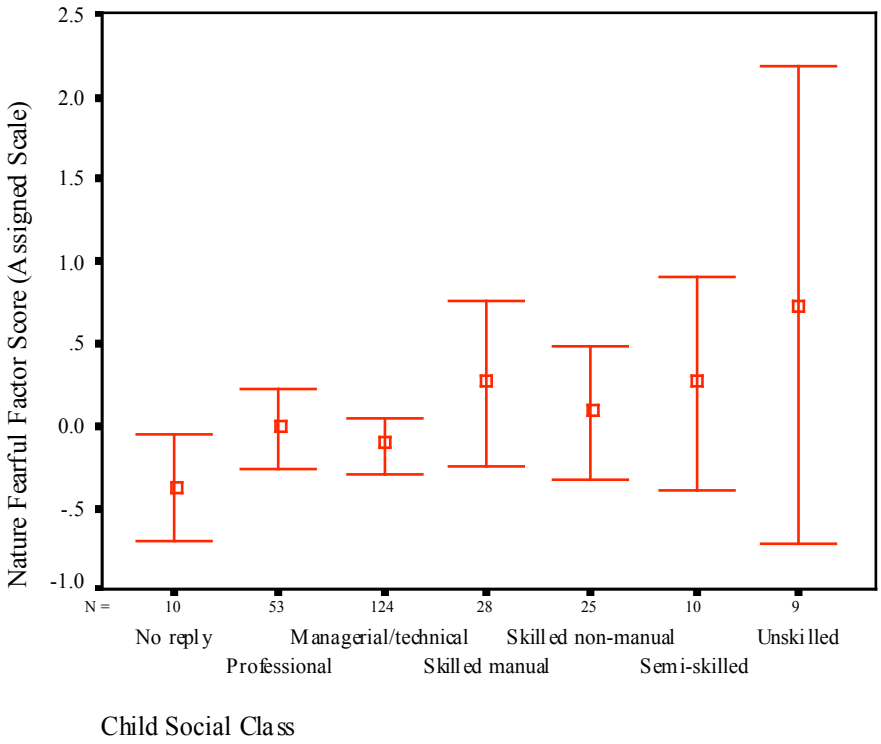


Figure 7.10: Social class versus ecoemotionality factor nature fearful

7.3.2.3 Social class and relative sympathies

The test was a mixed 2-way MANOVA, with the between subjects independent variable being *dad class* and the within subjects dependent variable being relative sympathies status as represented by the four factor scores derived from the relative sympathies scale (i.e. environment, animal, and human). The mean values for these four factor scores by social class are shown in the following Table.

	Environment Sympathy		Animal Sympathy		Human Sympathy	
	M	SD	M	M	SD	M
No reply	-.15	.77	.26	1.95	-.02	.88
Professional	.42	1.02	.02	.95	.21	1.02
Managerial/technical	-.22	.97	-.07	.98	-.10	1.04
Skilled manual	-.06	1.07	-.11	.86	-.10	.73
Skilled non-manual	.29	1.00	-.25	.67	.15	1.18
Semi-skilled	-.15	.64	.48	.78	.04	.85
Unskilled	.40	.68	1.13	.65	.11	.73

Table 7.20: Social class by relative sympathies factor scores

There were significant interactions revealed with relative sympathies factors *environment* (F (6, 279) = 3.83, $p < .01$), with a significant difference between professional and managerial, and; *animal* (F (6, 279) = 2.84, $p < .05$), with significant differences between unskilled and non-manual/manual/managerial, and a significant ($p < .05$) correlation (the sum of squares table for this analysis is shown at Appendix 11.3.4.21).

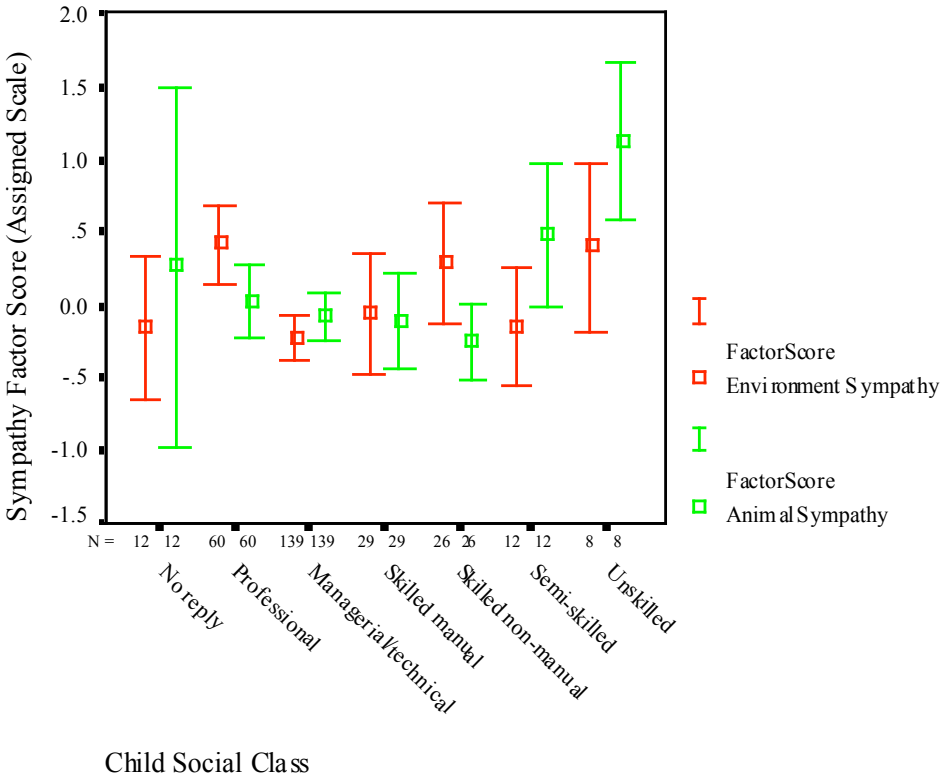


Figure 7.11: Social class versus relative sympathy factors environment and animal

7.3.3 Education and attitudes to nature

This set of tests examined the relationship between the education of respondents as represented by the variable *education level* and, by turns, ecoevaluations, ecoemotionality and relative sympathies.

7.3.3.1 Education and ecoevaluation

The test was a mixed 2-way MANOVA, with the between subjects independent variable being *education level* and the within subjects dependent variable being ecoevaluation status as represented by the four factor scores derived from the ecoevaluation scale (i.e. technocentric, anthropocentric, conservationist, and ecocentric). The mean values for these four factor scores are shown in the following Table.

	Technocentric		Anthropocentric		Conservationist		Ecocentric	
	M	SD	M	SD	M	SD	M	SD
Pre O level	-.20	1.08	.65	.82	-.21	.73	-.20	.97
Post O level	.03	.98	.15	.99	-.32	1.08	-.13	.86
Post A level	-.31	.95	.02	.95	-.41	.81	.07	.85
Undergraduate	.18	.95	-.15	.92	.12	.95	.02	1.12
Postgraduate	-.10	1.04	-.14	1.00	.01	1.08	.04	.99

Table 7.21: Education by ecoevaluation factor scores

The only significant interaction revealed was with ecoevaluation factor *anthropocentric* ($F(4, 218) = 3.35$, $p < .05$), with the significant difference being between pre-O level and undergraduate/postgraduate, and a negative correlation ($p < .01$) (the sum of squares table for this analysis is shown at Appendix 11.3.4.22).

7.3.3.2 Education and ecoemotionality

The test was a mixed 2-way MANOVA, with the between subjects independent variable being *education level* and the within subjects dependent variable being ecoemotionality status as represented by the four factor scores derived from the ecoemotionality scale (i.e. secure, fearful, dismissive, and stoic). The mean values for these four factor scores by pet variables are shown in the following Table.

	Secure		Fearful		Dismissive		Stoic	
	M	SD	M	SD	M	SD	M	SD
Pre O level	-.17	.82	-.03	.91	.51	1.02	-.45	1.17
Post O level	-.02	1.06	-.03	1.32	.30	1.08	.14	.78
Post A level	-.18	.78	.16	.75	.06	.87	.01	1.08
Undergraduate	-.02	1.07	.12	1.01	-.10	.93	.09	1.01
Postgraduate	.10	1.02	-.20	.94	-.13	.99	.04	.96

Table 7.22: Education by ecoemotionality factor scores

The only significant interaction revealed was with ecoemotionality factor score *dismissive* ($F (4, 244) = 3.00$, $p < .05$), with simple effects demonstrating a significant difference between pre-O level and postgraduate, and a significant ($p < .01$) negative correlation (the sum of squares table for this analysis is shown at Appendix 11.3.4.23).

7.3.3.3 Education and relative sympathies

The test was a mixed 2-way MANOVA, with the between subjects independent variable being *education level* and the within subjects dependent variable being relative sympathies status as represented by the four factor scores derived from the relative sympathies scale (i.e. environment, animal, and human). The mean values for these four factor scores by pet variables are shown in the following Table.

	Environment Sympathy		Animal Sympathy		Human Sympathy	
	M	SD	M	M	SD	M
Pre O level	-.58	.92	.30	1.47	-.56	.80
Post O level	-.30	.95	.06	1.37	-.27	.79
Post A level	-.19	.78	.22	.87	.04	1.17
Undergraduate	.09	1.04	.00	.97	.05	.98
Postgraduate	.14	.96	-.15	.78	.21	1.02

Table 7.23: Education by relative sympathies factor scores

The significant interactions revealed were with relative sympathies factor *environment* ($F (4, 271) = 3.73$, $p < .01$), with simple effects showing the significant difference between pre-O level and undergraduate/postgraduate, and a significant ($p < .01$) correlation; factor *human sympathy* ($F (4, 271) = 3.79$, $p < .01$), with simple effects showing the significant difference between pre-O level and postgraduate and a significant ($p < .01$) correlation. There was also a negative correlation ($p < .05$) with factor animal sympathy (the sum of squares table for this analysis is shown at Appendix 11.3.4.23).

7.3.4 Adult home and attitudes to nature

This set of tests examined the relationship between the number of childhood homes as represented by the variable *live now* and, by turns, ecoevaluations, ecoemotionality and relative sympathies.

7.3.4.1 Adult home and ecoevaluation

The test was a mixed 2-way MANOVA, with the between subjects independent variable being *live now* and the within subjects dependent variable being ecoevaluation status as represented by the four factor scores derived from the ecoevaluation scale (i.e. technocentric, anthropocentric, conservationist, and ecocentric). The mean values for these four factor scores are shown in the following Table.

	Technocentric		Anthropocentric		Conservationist		Ecocentric	
	M	SD	M	SD	M	SD	M	SD
City	-.07	1.08	-.02	1.05	.18	.95	.05	1.02
Town	-.08	.94	-.17	1.09	-.08	1.11	.07	1.12
Village	.19	.84	-.10	.87	.05	1.00	-.25	1.02
Country not farm	-.18	1.06	-.18	.80	.11	1.05	.02	.76
Farm	.15	1.00	.31	.97	-.37	.91	-.03	1.01

Table 7.24: Adult home by ecoevaluation factor scores

The only significant interaction was with ecoevaluation factor *conservationist* ($F(4, 224) = 2.57$, $p < .05$), with the significant difference being between city and farm, and a negative correlation ($p < .05$) (the sum of squares table for this analysis is shown at Appendix 11.3.4.25).

7.3.4.2 Adult home and ecoemotionality

The test was a mixed 2-way MANOVA, with the between subjects independent variable being *live now* and the within subjects dependent variable being ecoemotionality status as represented by the four factor scores derived from the ecoemotionality scale (i.e. secure, fearful, dismissive, and stoic). The mean values for these four factor scores are shown in the following Table.

	Secure		Fearful		Dismissive		Stoic	
	M	SD	M	SD	M	SD	M	SD
City	.03	1.05	.34	1.11	-.25	.94	.00	1.02
Town	.25	1.01	.17	1.19	-.03	.97	-.01	1.07
Village	-.15	.94	-.25	.75	.12	1.09	.15	.93
Country not farm	.18	1.04	-.37	.64	-.20	.94	.16	.87
Farm	-.29	.87	-.31	.77	.50	.93	-.17	1.03

Table 7.25: Adult home by ecoemotionality factor scores

Significant interactions were revealed with ecoemotionality factor *fearful* ($F (4, 251) = 6.39$, $p < .01$), simple effects showing the significant difference to be between city and village ($p < .05$)/country not farm/farm (both $p < .01$), and a negative correlation ($p < .01$), and; factor *dismissive* ($F (4, 251) = 5.60$, $p < .01$), simple effects showing the significant difference to be between farm and country not farm/city, and a significant correlation ($p < .01$). Factor *secure* also came close ($p = .060$) to a significant interaction (the sum of squares table for this analysis is shown at Appendix 11.3.4.26).

7.3.4.3 Adult home and relative sympathies

The test was a mixed 2-way MANOVA, with the between subjects independent variable being *live now* and the within subjects dependent variable being relative sympathies status as represented by the four factor scores derived from the relative sympathies scale (i.e. environment, animal, and human). The mean values for these four factor scores by pet variables are shown in the following Table.

	Environment Sympathy		Animal Sympathy		Human Sympathy	
	M	SD	M	M	SD	M
City	.24	.93	.17	.94	.15	1.03
Town	.16	1.09	-.20	.75	.25	1.04
Village	-.19	.84	-.33	.68	.18	1.05
Country not farm	.05	.85	.06	1.38	-.01	.89
Farm	-.46	1.10	.04	1.14	-.58	.70

Table 7.26: Adult home by relative sympathy factor scores

Significant interactions were revealed with all three factors.

- *environment* $F (4, 278) = 5.56$, $p < .01$, with simple effects showing significant differences between farm and city/town, and a negative correlation ($p < .01$);

- *animal* F (4, 278) = 2.41, $p < .05$, with no simple effects;
- *human* F (4, 278) = 7.19, $p < .01$, simple effects showing significant differences between farm and all other values, and a negative correlation ($p < .01$).

(the sum of squares table for this analysis is shown at Appendix 11.3.4.27).

7.4 Hypothesis seven: Adult behaviour toward nature is shaped by childhood factors, independently of adult attitudes

Whilst, as is evident from the analysis of the foregoing hypotheses, certain early experiences seem to have particular later attitudinal effects, the relationship between early experience of nature and later pro-environmental behaviour may not be as straightforward as the conventional experience-attitudes-behaviour model might suggest. Previous research has shown that attitude-behaviour relationships can sometimes be weak, whilst this thesis has shown that in - for example - the area of pro-environmental activity, the correlation between parental and later adult behaviour can be strong: this begs the possibility that some behavioural learning may occur and be maintained through unselfconscious habit rather than through cognitive or affective experience.

Sufficient data have been gathered for an analysis that would test this hypothesis, which postulates that some or all adult behaviours may be demonstrably related to or influenced directly by childhood experiences, without necessarily being based on conscious adult attitudes.

To complete this account, having performed exhaustive analyses of the relationships between experiential and attitudinal variables, two further sets of analyses would be required: between the variables representing experience and behaviour, and between those for attitudes and behaviour. Whilst it would be possible to make simple comparisons of the strength of various relationships, this would not provide a high standard of test. A more appropriate method is likely to be 'structural equation modeling' of this triangular set of relationships. This has successfully been used in a variety of investigations concerning environmental attitude-behaviour correspondences (Vitterso, Kaltenborn et al. 1998; Williams, D. R., Vogt et al. 1999) and is likely to prove fruitful in providing a suitably robust test of this hypothesis.

However, given the very considerable volume of analytic data already processed and, above all, time constraints, reluctantly the decision has been taken to delay mastery of a new set of statistical techniques and the examination of this hypothesis to a later date.

7.5 Summaries of findings

7.5.1 Hypothesis FOUR

Hobbies

- 62.4% had a nature hobby, of whom 94% pursued it at least sometimes;
- anthropocentrism varies significantly with favourite hobby;
- those with a nature hobby are more nature secure score and have higher environment and lower human sympathy, and human sympathy also declines with increasing hobby frequency;
- there is a significant difference in animal sympathy between hobby frequency sometimes and often, but no clear pattern;
- favourite hobby varies close to significantly with animal sympathy ($p = .051$).

Media

- absence of a television increases anthropocentrism;
- those with a television are less *nature dismissive;*
- increasing viewing of nature TV raises *nature secure* and diminishes *anthropocentric.*

7.5.2 Hypothesis FIVE

Pets

- the presence of *pets* significantly raises both *animal sympathy* and *ecocentrism;*

- *nature fearful* decreases significantly from one to three mammal types, and *nature dismissive* falls significantly between one and three non-mammal type;
- *environment sympathy* rises significantly between none/one/two and three or more non-mammal types;

Siblings

- *anthropocentrism* rises and animal sympathy declines with increasing sibling numbers;
- there is a significant rise in *conservationist* between none and three siblings, but no clear trend overall;
- economists and electronics had conspicuously the lowest mean *menagerie* scores, but not significantly so;
- those with a larger *menagerie* in childhood tend to live more rurally as adults.

7.5.3 Hypothesis SIX

- Children who never move home are most technocentric and anthropocentric; and the more they move the less anthropocentric they become, with the most significant effect being from the first time of moving;
- Ecoemotionality *dismissive* falls and relative sympathy *environment* rises with rising home mobility;
- *Nature fearful* and *animal sympathy* fall with rising social class;
- Education diminishes anthropocentric, nature dismissive and animal sympathy, and raises environment and human sympathy;
- *Conservationist*, *nature fearful* and both *environment* and *human sympathy* fall with increasingly rural living, while *nature dismissive* rises.

7.5.4 Hypothesis SEVEN

Postponed to a later date – see explanation above.

Chapter 8: Discussion: Hypotheses and results

This discussion is undertaken in two sections. The first part addresses each of the hypotheses in turn, attempting to relate the specific findings to each other, extracting where possible larger messages and proposing consonant explanations for why the relationships this implies might occur. The second part moves on to relate these outcomes to the wider bodies of knowledge with which this research engages. Conclusions are drawn, and a number of novel theoretical postulations are proposed.

8.1 Hypothesis one summary and discussion

'Adult attitudes to nature are related to parental attachment status'

8.1.1 Summary of main findings

- Higher *paternal care* equates to lower *ecocentrism* and *environment sympathy*. Low *paternal care* (and absent bonding compared to secure attachment) relates to higher *adult ecoactivity*. *Secure* paternal attachment scores lowest for *nature secure*. High *maternal care* is associated with greater *nature dismissiveness*, and comes close to a negative association with *ecocentrism*, and a negative correlation with *environment sympathy*. The degree of affectionless control compared to secure attachment is close to an association with higher *ecocentrism*.
- *Overprotective* mothering is associated with higher *nature fearfulness*, lower *stoicism*, and *favourite place away from home*. Children of *overprotective* fathers score lower for *wander*, and *paternal overprotection* correlates negatively with both *play* and *wander*.
- One sample sub-group is maternally insecure (dismissive avoidant), the rest are rated as secure.
- Both the above attachment factors, care and overprotection, for both parents, are higher (though mostly non-significantly) when the favourite place was away from home (see figure below). Higher paternal overprotection correlates with both decreasing play and wander.

8.1.2 Discussion

It is clear that both parental attachment factors have distinct influences on their child's later environmental attitudes. Care scores for both parents have influence on all three attitudinal measures employed. Parental overprotection on the other hand has a number of behavioural consequenses for both parents, but the only attitude influence is that of mothers on ecoemotionality.

The principal consequence of care appears to be on the degree of 'closeness to nature'. Those whose parents invested high levels of care are less ecocentric, less sympathetic to the environment and, in the case of mothers, more nature dismissive. Low levels of care appear to engender the opposite: in the case of fathers, this also leads to higher adult ecoactivity (particularly for absent bonding compared to secure); for mothers, affectionless control compared to secure is close to being associated with higher ecocentrism.

Why would generous caring from either parent diminish closeness to nature? There are several potential explanations, not necessarily mutually exclusive. It could be that parents who are high carers themselves have no great affection for nature, and transmit their own specific values (begging the almost circular question of why that might be so, which will for now be put to one side). It may be that children who receive the highest degrees of care are so engagingly socialized into the company of their mother or of other humans that their need for intersubjective relations is satisfied by human company, unintentionally leaving little 'mind share' for the non-human. Or, it may be that high care – which can perhaps be conceived of as indulgence or 'spoiling' – itself acts as a coercion or obstruction, imposing human company where the child left to choose freely would seek familiarity with the non-human. Children who receive moderate and lesser degrees of care may, conversely, have more unoccupied time during which, for lack of better options, relating to the non-human happens to occur, or may – perhaps as a reaction to feeling inadequately cared for - feel more of a need to seek out the excitement and comfort (including freedom and self-discovery) nature can offer.

The particular correlation between high maternal care and increased nature dismissiveness is consistent with the above explanation, but is itself intriguing. It implies that mothers have some special emotionally salient influence that fathers lack, which carries over to, or otherwise perturbs, their children's affective response to the non-human. It may be merely that this effect is strongest with primary caregivers, or some other reason: a distinction cannot be made without further investigation.

Overprotective parenting by contrast seems principally to affect the child's pattern of recreation. Overprotective fathers prevent the child from wandering far, less protective

fatherhood is close to an association with higher play. Overprotective mothers also affect child behaviour, seemingly driving them to more distant favourite places, but also increasing fear of and decreasing stoicism about nature.

The nature stoic factor appears to describe resignation insofar as there is little sense of trying to avoid contact with nature, yet being in it reduces inner feelings of happiness. Thus one might speculate that the overprotected child may have taken on a disempowered relational quality in which discomfort is felt (possibly as a result, in this instance at least, of increased nature fearfulness), but that this state is accepted as unavoidable and therefore tolerated. It is interesting to speculate how this might relate to having a more external than internal locus of control.

Children of overprotective mothers also tend to have a favourite place away from home. This is highly unlikely to be because such mothers lead their children further into nature or away from home since neither *nature mentor* nor frequency of *country trips* remotely correlates with maternal overprotection. Hence the much more likely explanation is that such children experience a smothering quality from their mother, preventing them finding independence within their mother's close orbit. As a result, they preferentially recall their favourite place (and presumably the strong positive feelings overwhelmingly associated with such) from times when they either wandered far from home or, possibly, were on holiday.

It appears clear that the father's role can also be deeply affecting in terms of how far the child is allowed, or feels it has permission, to roam. The more overprotective (which, in terms of two dimensional attachment space, has also been termed anxious or constraining) the father, the less the child appears to play and wander (the latter being a proxy for autonomous exploration). Given the finding elsewhere that a critical factor for the child who is to grow up into a pro-environmental, nature secure adult is the freedom to play and wander in nature without adult sanction, it can be suggested that paternal anxiety about a child's safety or ability to look after her or himself at an age where it is developmentally appropriate for the child so to do may be particularly damaging to later feelings of ease with, and lack of fear of, nature.

It was expected that the mean attachment for the whole sample as well as that for each sample sub-group would be secure. The one sample sub-group that is insecure is worthy of comment. This group (CHE), taken from mature students at a self-described radical graduate school that espouses 'deep green' values, had a mean of attachment in the dismissing avoidant quadrant. As such, and given the relationships that have been demonstrated between parental attachment and attitudes to nature, it may not seem a surprising conclusion that those with a self-evidently strong ideological orientation to nature differ from other

sample sub-groups. However that seems not to be the case: the other sample sub-group which might be expected to share this radical ecopolitical stance (ecoradicals) have maternal care scores no different from all other groups. Perhaps the critical factor is the subject matter they are studying, 'human ecology'? Unlikely - the other group of mature students surveyed study this same subject and have normal maternal care and *lower* than average maternal overprotection scores. However the author's close personal familiarity with both institutions allows a confident judgment that the VUB course is taught from an acknowledged 'light green', technocratic orientation. A remaining potential explanation, therefore, may be a particular attraction to dismissing avoidant (also termed absent or weakly bonded) individuals. As suggested above, those more likely to feel close to nature as a result of poor parental relations and of having been left to their own devices take a more emotionally founded academic (and hence, some might suggest, abstracted and theorising yet arguably manipulative) approach to 'saving the world'. Numbers are small here, though, and these conclusions must be very tentative.

Those whose favourite place was away from home score higher (though mostly non-significantly) for both attachment factors, for both parents, than those for whom the favourite place was close. This is a pattern that might be accounted for again with either or both of 'push' or 'pull' arguments. It could be that higher care and overprotection, which moves subjects toward the affectionate constraint attachment quality, creates a desire in the child to seek and find escape from parental attention, or at least makes time spent with them less enjoyable. Or it could be that children who most enjoy the greater independence of favourite places away from home somehow reinforce parental care and overprotection behaviours, perhaps because they are perceived as being at more risk. Given that low paternal overprotection is associated with higher play, it is safe to claim that there is some evidence here for the former, without necessarily ruling out the latter.

The overarching and perhaps most significant question that examination of this hypothesis can bear upon is whether our relations to nature echo or are distinct from parental attachment patterns. If one accepts that we relate to nature affectively through an innate attachment mechanism requiring lived experience of nature for its full fruition (one formulation of 'biophilia', tested later in this chapter), there are two possibilities as to how it is expressed: that attachment to nature is merely a reiteration of the fundamental pattern of attachment to the primary caregiver (or global attachment style), or; that it is a distinct relationship in its own right whose attachment status is negotiated and maintained with the non-human, separately from other relationships. Since secure attachment to parents is clearly associated with decreased affection for nature, the former is disproven. The latter is of course what one would expect, particularly if relations with nature are conceived of as relationships

with a subjective other: this would be consistent with the knowledge that differentiated relationship-specific attachments develop (Mikulincer and Arad 1999; Pierce and Lydon 2001) and that hierarchic distinctions between human attachment relationships exist (Trinke and Bartholomew 1997).

However this possibility would be the most difficult to demonstrate from the evidence herein, since if it were (universally) so there would be no evident relationships between parental attachment status and relations with nature. But there are. The final and intriguing possibility is that children establish relations with nature *reactively*. That is to say, poor human attachment *drives* greater affection for (and by implication, the possibility of attachment to) nature, as children seek to fulfill unsatisfied attachment needs by substituting 'mother nature' for 'mother'. This seems to be so. This is not to claim that all people who are close to nature as adults had bad relationships with their parents, but that - from this evidence - poor human attachment appears to be *one of* the reasons why some people establish such relations. Furthermore, whilst this is not of course proof of nature's inherent subjectivity, it does at least suggest that humans *can* relate motivationally and affectively to the non-human within such a behavioural framework.

Finally, it is worth noting that the factors extracted from several of the adult attitudinal and behavioural measures (for example ecoemotionality factors nature secure and dismissive, and outdoorsiness factors at ease and loner), are distinctly reminiscent of an attachment-like typology. In a future investigation of 'attachment to nature' the attachment dimensions of care/avoidance (an axis also termed 'internal working model of other') and overprotection/anxiety (also 'internal working model of self') (Bartholomew 1990; Griffin and Bartholomew 1994) might productively be substituted for by parallel dimensions putatively labeled 'nature trust' and 'nature acceptance/acceptance of self in nature'. Indeed it may be that the attachment model employed in intersubjective human relations, which is increasingly accepted as valid for human-companion animal relations, is also to some degree valid for human - non-animal nature (and therefore also animal - non-animal nature). The perhaps over-casual use by previous authors of the phrases 'attachment to place' and 'attachment to nature' could prove not be mere convenient analogies but a tangible psychological phenomenon in which non-animal nature can authentically be treated with shades of subjectivity and an 'internal working model of nature' (or multiple models or differentiated parts of nature) postulated. A reanalysis of the data presented herein may throw some light on the validity of such a speculation.

In conclusion, parental attachment clearly has a number of coherent effects on attitudes to nature. Importantly, relationships with nature do not seem to be modeled on parental relationships. High care and secure human attachment seem to distance the non-human. High

overprotection seems to prevent children exploring nature; when they can escape such anxious parenting, they find independence in favourite places far from home. There may be strand of 'reactive' environmentalism that is built on rejective (absent or weak) parental bonding, and the search for a substitute in nature.

8.2 Hypothesis two summary and discussion

'Adult attitudes to nature are affected by direct contact with nature as a child'

8.2.1 Summary of main findings

- Farm children, who not surprisingly lived less mobile lives in greener, more rural environments, are strongly technocentric/ anthropocentric and weakly conservationist. They are less nature secure and more dismissive than urban/ rural children and, with rural children, less nature fearful. They are also less sympathetic to the environment and humans than both urban and rural children.
- Education level correlates with absence of nearby 'domesticated' nature and greater urbanism.
- Sample sub-groups differ significantly in terms of childhood access to gardens, and nearby parks and woods.
- Increasingly frequent playing and wandering in nature reduces nature fearfulness. Nature secure and stoic rise with wandering frequency, as does environment sympathy. Nature dismissive, however, rises with playing frequency.
- There is lower anthropocentrism among those who had a favourite place, if that place was near home, and (very nearly) if it was not in nature. High nature secure also relates to having had a favourite place, and that place having been in nature. A favourite place near home relates to low nature dismissive. Having had no favourite place relates to low environment sympathy.

8.2.2 Discussion

From the results it is clear that the hypothesis is strongly supported from two separate directions, one of which was to some extent unanticipated. First, the degree and type of

readily accessed nature near the childhood home appears to leave a distinct mark on adult personality in the form of attitudes and behaviour toward nature. Second, the child's own behaviour in relation to nature close to home, and further afield, also has distinct relationships with adult attitudes. In particular, the phenomenon of independent exploration on the part of the child - unsupervised by adults - appears significant. These directions will be examined in turn.

It must be conceded that the measures chosen to assess the degree and type of accessible nature from those available in this body of evidence are among the more crude. The proportion of respondents that claimed to have experienced the more detailed measures - including contact with pets (86%), gardens (92%) and nearby parks, woods or countryside (96%) - was considered so high as to be statistically unviable when examined jointly as overall nature contact. It is therefore all the more remarkable that such clear relationships emerged.

8.2.2.1 'Given' nature

As far as the child's involuntary, given surroundings are concerned, urban children tend to be more sympathetic to the environment, less technocentric and less nature fearful than rural children. Whilst it is possible to argue convincingly that urban dwellers tend to possess a sentimentalized view of nature, this does not rule out the possibility that ready proximity to even degraded, urbanised nature engenders more secure attitudes to it.

The effects of living outside towns are, however, not straightforward. Rural children and farm children differ markedly on a number of attitudinal measures: farm children are more sympathetic to humans and less to the environment, more anthropocentric and technocentric, less nature secure and more nature dismissive. Increasingly rural children become more technocentric adults. Ecocentrism is similar in formerly urban and rural children but weaker in farm children. Conservationist is similar in formerly urban and rural children but markedly less in former farm children.

Taken together, these results suggest two main effects: that of increasing rurality (or decreasing urbanity), and; that of utilitarian interaction with nature. The first appears to be most evident when considering technocentrism: the more rural the child, the more technocentric are the attitudes held in adulthood. It could be that some aspect of farm living, be it the things the child does there, or the way the adults around them influence the child's attitudes, raises fear of nature and increases faith in the ability – and perhaps also the rights and the 'necessity' - of humanity to manipulate nature to our own ends. In relation to the

second apparent effect, it may be that a more matter-of-fact, utilitarian interaction with nature and the relative rarity (and perhaps also a greater significance of and lack of distraction when engaged in) contact with other people in an agricultural existence reinforces the perception that nature is less worthy of consideration and humans more so. In addition, there could well be other interpersonal effects of farm life (i.e. of encountering both relatively utilitarian adults and the farm animal- and land-scape) that affect children and which deserve further investigation.

One might speculate from another perspective that urban dwellers, having the readiest access to technology – living, it has been said, within the 'machine' that is the city - might have no obvious call for more of it in their lives, whereas rural dwellers are more likely to have direct experience of its absence and fallibility and therefore have a greater appreciation of the (mixed) benefits its successful application may bring. Farm children, being participants in a lifestyle that increasingly revolves around technological factors and interventions (science, machinery) to maintain viability, may consequently have the highest opinion of its usefulness. By this token one might predict a progressive rise over the last 200 years in the technocentrism of farm children, as technology has come to dominate farming practices.

The ecoemotionality findings suggest two distinct effects: that of non-urban children being comfortable (less nature fearful) with what is familiar – such that being surrounded by and having access to nature diminishes fears of the unknown, because it is no longer unknown, and; that of a lowering of regard (higher nature dismissive) – this might be seen as a less 'precious' attitude – for nature when it is seen as 'the factory', as some farming groups insist. There may be room here for an interspecies hypothesis paralleling the mechanism by which prejudice against human out-groups is increased when members of the out-group belong to an identifiably different group whose status is lower and socially sanctioned as such, and yet conversely negative out-group reactions are reduced where feelings of security are activated (Mikulincer and Shaver 2001). Alternatively, or additionally, a postulation from an (eco-)psychodynamic perspective might suggest that the utilitarian, agribusiness dictates of modern farming practice create a situation in which nature is 'being abused' and, to distance themselves from this abuse, farm children adopt a measure of denial or discounting of the sentience and intrinsic value of nature. Whilst no judgment is made at this point as to the 'rightness' of differing valuations of nature, it is noted that for the great majority of human groups urbanisation is an historically recent condition: it may be that the changed attitudes to nature it engenders, if indeed it does, are anomalous in terms of human social evolution and possibly inappropriate for a (traditional) agrarian existence.

Urban and rural children are both much more nature secure than farm children. This does not, as might at first be suspected, relate to the quality of parental attachment associated with differing vocations, since although the only clear interaction in that area is between maternal care and sample sub-group, farm children fall within the normal range. Again, one might hypothesise that whilst farm children may be comfortable with nature as existential surroundings, they and their families are more directly dependent on its beneficence for good times; being therefore at some level conscious of ways in which it can unpredictably 'bite back' (failed harvests, animal disease), they are less trustful of it. Alternatively, following the 'abuse' argument, there may be a parallel between the insecurities experienced and played out by, for instance, addict parents (e.g. alcoholics) upon their offspring, and those of farmers aware they are putting too much pressure on their land. These possibilities remain highly speculative.

More urban children become more educated. This effect may be one in which children have less opportunities to play in (enjoyable) natural surroundings in inner city environments and thus, finding less outdoor stimulation, spend more time at home studying. There is however a more interesting possibility which may be deserving of further attention by educationalists: that children with and without access to nature indulge in similar amounts of playing, but that those from less 'green' surroundings who have easy access to nature tend to learn relatively less about the natural world and relatively more about the human-made world. There is evidence, for instance, that childhood 'foraging' in nature leads to a more intimate and informed knowledge of biodiversity in adulthood (Chipeniuk 1995). Later, it may be that nature-familiar children may perform less well and thus do not progress as far in education not because they possess any less knowledge in a cumulative sense, but because they are mis-assessed by an education system over focused on anthropocentric, technology-related knowledge criteria.

More colloquially, this might be understood as a version of the notion of the 'wise farmer' who, having spent a lifetime on the land, might have far more insight into the state of his crops from a moment's inspection than an agricultural scientist with a decade or more of technical knowledge – yet the scientist is regarded as the 'expert'. Norberg-Hodge, alleging that economic development brings with it pedagogical assumptions that inexorably lead to the loss of the place-specific knowledge that constitutes one of the main sources of connection between indigenous population and their ancestral lands, prescribes what she sees as an urgent antidote:

> *'Instead of memorizing a standardized universal knowledge, children need to be given the tools to understand their own environment. In the process, the narrow*

specialization and urban orientation of Western-style education would give way to a broader, more contextual and ecological perspective. Location-specific knowledge of this kind would be holistic and specific at the same time. Such an approach would seek to perpetuate or rediscover traditional knowledge. It would build on centuries of empathetic interaction and experience with the web of life in a particular place.' (Norberg-Hodge 1992, 164)

Life and career choices may be related to access to nature in childhood. There were significant differences between sample sub-groups in the rate of presence of a park or woods nearby in childhood ($p < .05$). Two of the sample sub-groups, electronics and VUB, had notably less access to gardens than the norm ($p < .01$). There may be possible explanations in two directions, although their relative likelihood cannot be ascertained from this evidence: that for non-nature related reasons (e.g. parental personality factors) these children were already at a very young age involuntarily living in such places and also destined for this type of future or, more plausibly; that the lack of access to domestic nature had – as with so many other variables in this research project - marked and lasting effects on the objects and styles with which they most readily relate as adults.

8.2.2.2 Play and exploration choices

For the second body of evidence, it is clear that children's free pattern of play (and the freedoms they are allowed) affect their later attitudes to nature. However it is worth remarking overall that, unlike with relationships to 'given' nature, no significant relationships were found between the child's play and wander behaviours and adult ecoevaluations. Contrasting these ecoevaluation results with those for ecoemotionality (below), this hints at the possibility of differing mechanisms which lead to the formation of these, respectively, affective and cognitive attitudinal constructs that concern 'wilder', or at least less familiar, places.

Several significant relationships were uncovered with regard to ecoemotionality. As would be expected, rural children play and wander far from home more than urban. Children who play and wander more at some distance from home, probably having moved this far independently, are as adults less fearful of nature. Children who wander more frequently become adults who are more nature secure and, interestingly, stoic, suggesting that perhaps increased tolerance for nature's vicissitudes can come about through experience (or that accepting children, experiencing less fear, are happy to wander more). Nature dismissive also rises with playing frequency: this could be because having secure attachment (higher

maternal care having been linked to increased nature dismissiveness in hypothesis one discussion, above) is characteristic of parents who trust their children to play more often, or the converse; that more frequent playing leads to an attenuation of emotional salience ('familiarity breeds contempt').

It will be noted that in very many of these relationships, two contrasting explanations could be mounted to account for the behaviour. First, that the child's behavioural choices are made because of some preconfiguration of personality that predisposes the child to, for example, feel secure in nature. The second possibility is that the child's behavioural choices – and quite possibly parentally sanctioned freedom - to play at a distance from home lead to intimate familiarity with nature and thus later feelings of security in it. It is not possible from this evidence adequately to distinguish between the 'personality' and 'parental influence' accounts – and the reality may prove to be more of a 'constructionist' dialogue between the two forces – but it remains an intriguing question. Whether the locus of control is the child's or not, it seems clear that the child's freedom to explore at its own leisure may be pivotal to the development of its relationship with nature.

In this context the increasing urbanization occurring globally is a concern. Parents' increasing fears in recent decades over dangers to their children outside the home – leading to such behaviours as an enormous increase in the proportion of school age children being driven rather than making their own way to school (Hillman 1992) – are surely evident in the steady decline in wander child behaviour ($p < .01$) over the lifetimes of participants in this survey.

Having had a favourite place in nature correlates with lower ecoevaluation factor anthropocentrism, comes close with higher adult ecocentrism, and again correlates with feeling secure about nature. These changes are in the direction predicted – that closer and more intimate familiarity with nature predisposes more favourable later attitudes and lesser attitudes to humans. The argument is further reinforced by a highly significant correlation between nature secure and having had a favourite place, and a significant correlation with that place having been in nature: it may be suspected that an 'explorer' child learns that it is possible to feel secure in nature on their own account through the documented childhood favourite activity of 'den making' (and thus, one might wonder, of imaginative play).

With regard to ecoemotionality, there is a highly significant relationship between low nature dismissive and having had a favourite place near home. Given that there is no correlation between whether this favourite place is in nature or not and dismissive, this would tend to suggest that the degree of dismissiveness of nature is somehow related to the proximity of the home and its human factors, such as the relationship with parents. Taking

into account the fact that the only significant relationship between dismissive and parental attachment factors is a positive correlation with maternal care, it seems quite possible that the type of child who experienced low maternal care may be the same child that creates and frequently visits a special or favourite place near home as a refuge from their relatively rejective mother, a place which would be highly emotionally salient (i.e. not to be dismissed; perhaps a carrier of special meanings). Again, and as with the arguments concerning attachment behaviours in hypothesis one, both push and pull directions can be envisaged: high levels of maternal care may equally well crowd out opportunities for exploration.

It should be borne in mind that it is almost impossible to be certain from a retrospective survey of this kind that subtle or overt parental controls or sanctions do not play a larger part in shaping child play and wander behaviour than this analysis can reveal: in other words, children through the lens of their own reports may appear to have more freedom to choose than was in fact the case.

In conclusion, it is clear that direct contact with nature has a number of marked influences on adult attitudes to nature, probably over two main axes: the rural-urban, and; the degree of utilitarianism inherent in the lifestyle. Children's behaviour in playing in nearby nature has important effects, but it is in wandering autonomously away from home and discovering nature for themselves that closeness to nature is particularly awakened.

8.3 Hypothesis three summary and discussion

'Adult attitudes to nature are affected by parental behaviour'

8.3.1 Summary of main findings

- Higher parental ecoactivity is related to higher ecocentrism and nature secure, and the latter also to ecoactivity factor ecopractical.
- Overall ecoactivity is correlated between generations, with parental ecopractical the most influential factor. Ecopractical parents take their children on more country trips. Increasingly rural adult residence relates to increasingly ecopolitical parents.
- The more a child was taken on country trips, the more likely they are to have had a nature mentor, and the less anthropocentric they become. Among those with no nature mentor, human sympathy is greater, but as country trips become more

frequent anthropocentrism falls faster than it does among those who had a nature mentor.

- Nature media encouragement correlates with higher animal sympathy score, irrespective of nature mentor status.

8.3.2 Discussion

Parents who perform more overt pro-environmental behaviours are expressing what are normally classed as more pro-environmental values (which may account for the association with enhanced ecocentrism in their offspring); they may also be more likely to act in ways that familiarize their children with nature, leading to the greater nature secure scores among this group. The finding that ecopractical parents take their children on more country trips supports this latter contention. Whilst the attitudes of parents are inaccessible from this data, those who are particularly ecopractical may behave in such a way because they themselves feel secure in nature – certainly they enhance nature secure among their offspring.

It is clear that pro-environmental behaviours, particularly practical conserving ones are, ironically, conserved to a highly significant degree across generations. People tend to maintain what are now seen as ecologically friendly practices such as recycling and 'green' consumption that their parents modeled. In other words, leading by example works. This of course does not necessarily imply that such people are 'environmentalists' since, as a number of respondents pointed out, in the childhood of many older adults, the concept did not exist. For many it simply seems to have been the behaviour of those of limited material circumstances – a far greater proportion of the population in the past than now - or who perhaps had war-time habits of reuse and recycling that preceded more affluent and wasteful modern ways.

Higher levels of the parent ecopolitical factor may be associated with adult residence because parents who are more externally politically directed in their environmental views instill an affinity for the rural in their children. Alternatively, since rural children tend to settle in rural areas and vice versa, those who grew up in the countryside may have had parents whose lifestyles precipitated greater environmental activism.

Since a child taken on country trips by definition has someone who is willing to take them, it stands to reason that the more trips they recall, the more likely they had an adult from whom they remember learning about nature - a nature mentor. In line with numerous other findings of increased direct contact with nature, the child's anthropocentrism would then fall as nature becomes more meaningful and humanity's role in manipulating it

becomes more evident. By contrast, the absence of a nature mentor would mean the child was probably afforded fewer opportunities for reassuring companionship in non-human settings (and perhaps, speculatively, could also indicate a relative dearth of close caring adults overall), leading perhaps to a yearning for human company alongside a relatively poor familiarity with nature, accounting for the higher human sympathy in such cases. This might also contribute to an explanation of the more rapid fall in anthropocentrism with increasing country trips among non-mentored children: the increased familiarity with nature gained may open the door to displacement of human interpersonal needs onto the non-human.

Tentatively one might conclude that the adult's role in introducing the child to natural phenomena is a subtle and multifactorial one, resting not on overt teaching of intellectual positions and argumentation, but rather on practical interactions with nature and on the positive emotional quality the adult brings to such interactions.

That nature media encouragement relates to higher animal sympathy, irrespective of nature mentor status, discounts the possibility that direct learning about animals (from the nature mentor) would account for the greater sympathy. It is possible that children who watch more nature television due to parental encouragement learn about animals from that – but since animal sympathy does not correlate with the frequency of TV viewership, that is not likely. We are therefore left to speculate that it may be some aspect of the encouragement – either the parents' own viewing habits rubbing off on the children, or the parents' 'encouragingness' – that may be the reason.

In conclusion, it is clear that parents who behave in enthusiastic terms toward nature, particularly if that expression is practical, bequeath that environmentalism to their children. Adults who act as guides and facilitators of children's enthusiasm to discover the natural world have a lasting influence on their attitudes.

8.4 Hypothesis four summary and discussion

'Adult attitudes to nature are affected by indirect and vicarious childhood experience of nature'

8.4.1 Summary of main findings

- Approximately two-thirds of children had a nature-related hobby, the vast majority of whom pursued it relatively frequently. Such children become adults

who are more nature secure, more sympathetic to the environment and less so to humans;

- Children with a television are less *nature dismissive*, and increasing viewing of nature TV raises *nature secure* and diminishes *anthropocentric*. Absence of a television increases anthropocentrism.

8.4.2 Discussion

This hypothesis is concerned with Kellert's second and third domains of childhood nature experience (Kahn Jr. and Kellert 2002; Kellert 1996). Such was the majority experience for respondents to this survey. Approximately two-thirds of children had a nature-related hobby, and most pursued it frequently. Around nine in ten had at least two of pets, a garden or a nature hobby. Two in 5 had what seemed to be 'direct' nature hobbies; one in 5 'indirect' hobbies, and; one in 3 'vicarious' hobbies (for details see chapter 6). As far as literature is concerned, just one in 10 never remember reading nature books, whilst two thirds did it at least sometimes. Bearing in mind the relative rarity of television in the youth of a considerable proportion of older participants, it is notable that just one in 12 never remember listening to radio or watching nature media and, again, two thirds did it at least sometimes. Not surprisingly, reading nature books and watching nature media are correlated ($p < .01$).

Having a nature hobby can, arguably, rest on what Kellert might term direct contact with nature, for instance bird watching or botanical classification, and particularly if arrived at through the mentorship model of a parent or relative who early in the child's life encouraged careful observation of what is serendipitously encountered for its own sake. Yet to the mind of this author the motivation to indulge in such activities in the modern world – requiring as they often do (in the context of a declining proportion of adults that have such unforced familiarity with nature, and an enormously impoverished natural world) a willingness to learn the necessary subtle detail and fine distinctions from 'factual' rather than 'folk' sources – must increasingly be vicarious. Certainly, such 'nature study' could be a conduit through which nature-frustrated or -deprived children find an outlet, but even so there would appear to be a moving away from direct affective experience into the cognitive - the inevitable distancing from experience that abstract thought brings.

Nevertheless it is open to argument to choose to classify 'vicarious' nature hobbies (birdwatching, observing/ collecting) as 'direct', in which case fully three quarters of those who registered a preference could be held to have said that their favourite nature hobby was one involving 'direct' contact with non-domesticated nature. This could be viewed as both a

confirmation of common sense observations of children playing, and at the same time remarkable. Perhaps children have, or had, little choice in the matter: that which this investigation has classified as 'nature' may in the past have been the given surroundings of most children, and therefore the preference could just be based on familiarity. But given the substantial bodies of evidence for children's voluntary preferences for living things amassed elsewhere, it is clear that mere proximity cannot account for this predilection.

Child nature hobbies have unambiguous relationships with later sympathies. Having had a nature hobby and pursuing it more rather than less often relates to greater environmental sympathy. The presence of such a hobby also relates to increased nature secure, and diminished sympathy for humans. These findings reinforce earlier conclusions that contact with nature, particularly first hand experience, acts to increase children's confidence in themselves in relation to it.

However the effects of indirect nature contact might act, it is clear that vicarious contact also has clear effects. Children with a television are less *nature dismissive*, and increasing viewing of nature TV raises *nature secure* and diminishes *anthropocentric*. As with direct nature contact, an increased familiarity with the non-human (and possibly also the decrease in the proportion of time spent in human company it implies) diminishes the assumption of superiority over nature that characterizes anthropocentrism. As if to confirm this, absence of a television (and hence an increased proportion and, some would maintain, quality of human interaction) increases anthropocentrism. However, whether the effect is one of broadcast content or form – in other words, it could be down to vicarious nature per se, or it could be an artifact of the hypnotic power of television viewing itself – awaits more fine-grained research.

These findings suggest that interaction with the non-human in any form increases feelings of security with respect to it. It may be that children who have already found nature rewarding have had their appetite whetted and enthusiastically seek increased knowledge and repetition of their experiences; this could work in tandem with the earlier finding that children with absent or weak parental bonding may reactively seek contact with nature. Another possibility is that endogenous personality factors drive the child away from the human and toward the non-human. None of these arguments are mutually exclusive, but neither are any proven.

Finally, it is worth noting that the nature child variable has not declined with the passage of time: in other words, whilst urbanization continues apace and opportunities to roam freely are daily curtailed, children over generations have not lost enthusiasm for personally interacting with nature where it is still possible.

In conclusion, both nature hobbies and watching nature media are the habits of children who become adults who feel close to nature.

8.5 Hypothesis five summary and discussion

'Adult attitudes to nature are affected by the size and nature of the animal and human 'menagerie' the child grows up in'

8.5.3 Summary of main findings

- The known relationship between pets and increased animal sympathy is confirmed. However, having pets also increases ecocentrism. Different pet types have different effects: increasing numbers of mammal pet types diminishes nature fearful, whereas; increasing numbers of non-mammal pets diminishes nature dismissive and raises environment sympathy;
- Menagerie has no significant attitudinal effects, although those with a larger childhood *menagerie* tend to live more rurally as adults;
- Bigger families however do have effects on environmental attitudes – rising sibling numbers increase *anthropocentrism* and diminish animal sympathy.

8.5.4 Discussion

8.5.4.1 Animal 'siblings'

That pet ownership in childhood correlates significantly with adult animal sympathy confirms previous findings (Paul and Serpell 1993; Poresky, Hendrix et al. 1988). Not surprisingly, the keeping of mammal and non-mammal pet types is also correlated ($p < .01$). This leads to the near tautological conclusion that those who like *particular* types of animals (which, of course, is more likely at an early age to have been coincident with the liking of the child's parents) like animals *in general* more than non-animal lovers.

The pattern of effects related to ecoemotionality is curious. Personal experience of increasing numbers of mammal pet types is associated with declining nature fearful. But the pattern is of a (non-significant) rise in fearful between none (effectively the control

condition) and one pet type, followed by consistent decline with more types. This would not be remarkable but for the repetition of the pattern for nature dismissive versus non-mammals, and for nature fearful and pet types overall.

It could be hypothesized that breaking through the barrier of interspecies relationships, which would in most cases be coincident with the first mammal pet type encountered is, because of its unfamiliarity, an inevitably anxiety-provoking process. If, however, further relationships are formed, the 'otherness' of animals may increasingly become normalised and accorded its own intrinsic value. Children with diverse experience would have more confidence with the non-human in general. There may be parallels with the process of racism, where increasing familiarity with members of an out-group usually leads to less antagonism.

Despite the failure of the 'menagerie hypothesis' elsewhere, this at least appears to be a partial vindication of the underlying idea that the diversity of sentient (and possibly non-sentient) encounters has effects on environmental attitudes. It could also much more speculatively be considered to suggest the possibility of 'resilience' with regard to relationships with nature. In humans, the long-term deleterious effects of poor relationships with primary caregivers can be compensated for through good relationships with others (Fonagy, Steele et al. 1994). It may be that having had a greater variety of non-human experience and thus an increased likelihood of an emotionally close relationship with a companion animal, pet owners would develop a greater assurance over their capacities to deal with the non-human, and greater self-esteem.

The highly significant correlation between ecocentrism and pets in childhood is also interesting, given previous findings. Paul (2000) concludes that whilst empathy for animals and humans are linked, they are not a single construct, being associated with pet ownership and childhood pet ownership for the former, and having a child at home with the latter. It therefore follows logically that sympathy for animals would not necessarily be the same construct as sympathy for the environment. Here, however, environmental sympathy is raised in association with pet ownership, but only of non-mammal pets. Increasing non-mammal pets also coincide with falling nature dismissive.

Evidently, first-hand experience with lower animals appears to broaden the base of sympathy from animals in particular to the environment more generally. This could be explained by the existence of an inbuilt, graduated facility for sympathy with organisms from different levels of the phylogenetic hierarchy, which is activated by experience.

8.5.4.2 Siblings

The finding that the more siblings a child had, the less their adult sympathy for animals, is counter to the direction Shepard predicted. Allied to this is the finding that the more siblings, the greater the adult's anthropocentrism.

Clearly there is, once more, an effect of familiarity in which the increased opportunity for (and possibly even unavoidability of!) more human encounters in larger families crowds out the 'voice' of the non-human. It may also be that even in large families where the children are enthusiastic explorers of nature in their own ready-made 'gang', individuals are less able to find the solitude characteristic of closeness to nature.

Lone children exhibit a higher (n.s.) degree of anthropocentrism than all other children except those from large families of 5 or more children, a curious echo of the rising-then-falling pattern of nature fearful with increasing pet numbers (see above). This could be explained by postulating a learned need in only children to hold others in high regard in order to achieve 'replacement siblinghood', whereas those with small numbers of siblings experience the highest level of unavoidable conflict (and consequent lasting anomie), which progressively diminishes with the multiplication of relationships and therefore the diffusion of their intensity that occurs as sibling numbers rise.

The finding that those from larger (pet plus human) families live more rurally as adults may just be a demographic artifact of the more rapid pace of change toward smaller family units in cities where pressure on space is greater and dwellings smaller.

In conclusion, while pet mammals enhance sympathy for animals, non-mammal pets also enhance wider feelings of care for the environment. Large numbers of siblings detract from contact with nature.

8.6 Hypothesis six summary and discussion

'Adult attitudes to nature are affected by social factors'

8.6.1 Summary of main findings

- Children who never move home are most technocentric and anthropocentric; and the more they move the less anthropocentric they become, with the most significant effect being from the first time of moving;

- Ecoemotionality *dismissive* falls and relative sympathy *environment* rises with rising home mobility;
- *Nature fearful* and *animal sympathy* fall with rising social class;
- Education diminishes anthropocentric, nature dismissive and animal sympathy, and raises environment and human sympathy;
- *Conservationist*, *nature fearful* and both *environment* and *human sympathy* fall with increasingly rural living, while *nature dismissive* rises.

8.6.2 Discussion

This hypothesis gathers various demographic data elements describing salient aspects of the child's life and, in the case of the variable adult home (= *Live Now*), the adult's present surroundings. The few variables considered here are not the central thrust of this thesis and cannot, of course, capture a complete view of social experience. Nevertheless, they throw interesting light on the relative influences of social, parental and childhood environmental experience in influencing environmental attitudes (and indeed are deserving of further research attention in themselves).

House moves during childhood are not matters of little consequence to children: they appear to have significant effect on a number of environmental attitudes. That environment sympathy rises with house moves is perhaps counterintuitive, since one might expect the most settled children to develop the deepest emotional ties to their place, yet moving home in childhood seems to *increase* environmental sympathy. Furthermore, there is a highly significant correlation between increasing numbers of child movements and declining ecoemotionality nature dismissive. It seems that contrary to expectations the more a child experiences different home environments (and the upheaval it brings), the more the non-human seems to register as an important and valuable category of experience. Both these factors could vary as a consequence of the child needing to find a stable 'anchor' to hold onto through the emotional turbulence of finding itself in an unfamiliar place. Children in new environments, lacking the context of human friends could, for instance, find non-human surroundings less intimidating than the established social networks of other children. One might also bear in mind our nomadic history, and therefore the evolutionary normality of moving home.

It could also be that the exercise of having to build afresh a complete 'mental map', previously done instinctively at an earlier age and with – naturally – no prior expectation of having to do it again from scratch, is quite disorientating. The fact that this will (almost by

definition of its' having been remembered) occur in most cases in later childhood suggests that as a consequence of its state of mental development the child is likely to engage in a more self-reflexive and perhaps attentive exercise of finding self-in-nature, and that self-awareness matures into a greater regard for the non-human and a reduced willingness to discount it as emotionally meaningful. Another account in attachment terms might suggest that either or both of human or place disturbance lead to a need to find a stable replacement attachment figure, and that often is the new place.

Since anthropocentrism and technocentrism also decline with increasing numbers of home moves there is evidently a concurrent turning away from human company and achievements. It may be that this is due to a progressive loss of trust in human relationships that are regularly broken, or again that nature seems to the mobile child increasingly a constant in a sea of changing human faces, or a combination of the two such that the instability the child is faced with drives them to relocate their desire for predictable companionship to things which seem less mutable (although, curiously, conservation and ecocentrism do not as might be expected correspondingly increase –lending weight perhaps to the argument that the turn is away from humans but not toward nature). The fact that it is the first move that has the biggest effect also appears to bolster the 'loss of trust' notion.

However it may be that these effects are due to something additional and covariant about the character of highly mobile children's lives that has not been examined herein. They may more commonly be children of expatriates, for example (they are very significantly more urban than rural, and close to significantly (.057) the children of professional families); divorce may prefigure many house moves, or; highly mobile families provide less close relationships, which the child makes up for in interactions with nature. These other issues cannot be addressed from this data.

Higher social class relates to declining fear of nature and of animal sympathy. Education seems to act similarly, reducing animal sympathy. It may not be surprising that highly-qualified office-bound white-collar workers, who would - it might be imagined - inevitably interact less frequently with the non-human than lower class, manual and often outdoor workers, would be less sympathetic to animals. But by contrast with the whole population norm, more than half of the managerial/technical social class group in this sample are involved in farming and forestry. One might note that foresters are by definition people who enjoy non-sentient nature, and farmers have already shown themselves to be highly anthropocentric. There may therefore be room for the possibility that being or becoming affluent and the process of education de-emphasises if not denigrates the valuation of animals.

Education also reduces both nature dismissive and anthropocentric but increases sympathy for the environment and humans. These effects are markedly similar to the effects of the presence and increasing viewership of television, which is also associated with falling anthropocentric and nature dismissive (and, non-significantly, rising human and environment sympathy). It is therefore likely that the information content of both education and the media about the plight of humans and the environment outside the realm of immediate personal experience has some influence on children's attitudes. It could be considered paradoxical, however, that while sympathy for humans rises, anthropocentrism – a measure of the relative valuation of human interests against other life forms - should fall. But there is not necessarily dissonance between feeling that fellow humans are deserving of assistance, and not placing their needs above that of (what might be seen as) the even less favourable plight of the environment.

Finally, it is worth mentioning that there is a correlation ($p < .01$) between higher education level and greater numbers of child movements. This may be a proxy for some other factor – for example, parental mobility may be greater where the parents are themselves educated (potentially a circular argument), or especially ambitious for themselves or their offspring - or there may be some direct effect such as that disturbed human or place attachment may influence the child toward finding security less in physical surroundings and more in abstracted educational settings or, finally, there may be some effect of repeated moves on the kind of intelligence that helps children pass examinations.

Rural dwellers are less afraid of, caring about and sympathetic to nature, and less sympathetic to humans. This pattern might be summarized (from an urban perspective) as 'brutalisation'; but from the countryside the urban dwellers' opposite stance might be seen as 'sentimentality'. Either way, the effect is robust and evidently a consequence of the degree to which fellow humans dominate our interactions.

Throughout this body of work former farm children have emerged as markedly the most anthropocentric adults, yet rural adults have significantly lower human sympathy. This might seem contradictory, but for the same reasons as are rehearsed above with regard to education and the media, may not be so incomprehensible. It may be that there is not a close identity between the average values of former farm children and those who now live on farms (because the farmers who have sold up and moved off the land differ psychologically from those who have stayed, or because of turnover of rural residents – the ones who stayed or have been attracted inward being the most misanthropic). Or it may be that anthropocentrism in general terms is expressed because of a direct awareness of reliance on exchanges with other humans and their technologies for survival (and the fact that agriculture clearly acts at the margin between the human and non-nature, bending nature to serve human needs), but

that this does not translate into sympathy for humans in the specific, the farm child being relatively unfamiliar with large numbers or groups of humans. Either way it is an interesting and confounding apparent contradiction that begs further investigation.

In conclusion, moving home brings about changes in children that distance them from humans and brings them closer to nature.

Chapter 9: Discussion: Childhood, attachment and environmentalism

This second part of the discussion attempts to make sense of inferences drawn from the empirical evidence gathered and analysed above, in the context particularly of the current literatures of attachment and childhood precursors of environmentalism. Seven arguments are made bearing upon both fields, followed by a final discussion in which a number of new theoretical possibilities for conceptualizing human-nature attachment and environmentalism are tentatively proposed. The seven arguments are, respectively:

- Parental attachment influences attitudes to the non-human
- Attachment to the non-human is a separate relationship
- Humans normally dominate socialization, followed by animals
- Exploration engenders nature security, assuming freedom from constraint
- Parents can constrain play and wandering, or facilitate nature security
- Vicarious nature experience satisfies some needs, but may not replace experience in reality
- Poor attachment can lead to displacement of needs onto the non-human

These arguments will be addressed in turn. There is of course considerable overlap of evidence underpinning several of these arguments: to avoid excessive repetition the chapter is assumed to be read as a whole. Numerous suggestions for research pursuing certain of these arguments appear in the final chapter, Conclusions.

9.1 Parental attachment influences attitudes to the non-human

As we have seen in the first part of this chapter, parental attachment status has distinct influences on attitudes to nature, namely:

- High levels of care appear to diminish nature sympathy through exclusion, or by transmission of parental values. Low care enhances ecocentrism.
- Paternal overprotection obstructs exploration; maternal overprotection increases nature distrust and disempowerment but also the likelihood (desire?) to escape.

There are two routes by which parental attachment relations could have their effect. Parents could affect the child's confidence with respect to nature, which would presumably have effects on the child's play and wander behaviour when parents are not present: this is discussed in the context of the later section on exploration. This section will henceforth concern itself with the other alternative, which is the impact that parental attitudes and behaviours toward child may have when the child is either within the parental orbit, or on the child's degree of interpersonal understanding towards humans.

Parental care and overprotection, the two components of attachment, are both measures of an aspect of the intensity of relation and, crucially, of *behaviours*. Care might broadly be seen as directed toward the child's internal life, and overprotection towards its external life, respectively. Exemplary parental care is an engagement with the child's felt needs, an egalitarian communicative dance in which the adult - as much servant as master – seeks genuinely to comprehend and respond to the child's mental life.

Parents who are best able to conceive of and think about relationships in terms of mental processes and functions (interests, desires, moral feelings) are most likely to bring up secure children (Fonagy, Steele et al. 1991). By this concern, the child learns that its needs are not to be feared, since they can be fulfilled, and that therefore both their internal and external worlds are to be trusted. This leads to secure attachment.

Secure attachment contributes to subjective well-being, emotional regulation, self esteem, positive perception of others, and well-adjusted interpersonal behaviour and cognitions (Collins and Allard 2001; Mikulincer and Florian 2001). Interaction with available and responsive significant others promotes attachment security (Bowlby 1973). Felt attachment security enhances the likelihood of being supportive to others in need (Collins and Feeney 2000).

Given that empathy (other-focused) and distress (self-focused) are distinct behaviours (Batson and Shaw 1991), there may be two opposing motivations for offering assistance: genuinely altruistic (seeking to comfort the other), and a more 'selfish' style built on poor attachment security, whose goal is primarily to ameliorate distress for the self. Indeed, Bowlby suggested that the sense of attachment security might relate dynamically to the

system for care giving behaviour, which provides protection to others in need (Bowlby 1969). Secure attachment is associated with responsiveness to a romantic partner's needs (Mikulincer, Gillath et al. 2001), but since other 'romance' factors may a part, better confirmation would be among nonintimates: the single such study to date confirms a relationship between supportiveness and lower anxiety and avoidance (Westmaas and Silver 2001). In other words, priming the sense of attachment security strengthens empathy and inhibits personal distress; more anxious and avoidant people are less empathic (Mikulincer, Gillath et al. 2001).

The crux of the matter for this thesis is that this predisposition to empathy and understanding in general does not spill over to the non-human in particular: the two possibilities – that such closeness tends to exclusivity ('smothering'), or that such parents themselves have little regard for the non-human and inadvertently transmit these values – have already been raised. The argument applies in reverse for low care relating to higher ecocentrism.

Overprotection, on the other hand, as a behaviour would be more concerned with placing a protective cordon around the child, the better to fend off the possibility of threats at the earliest stage. Given that secure attachment is a combination of high care and low overprotection, and noting that children are active participants in the attached dyads, it would seem that while less overprotection would serve to allow the child to encounter and learn from threats directly, high overprotection would tend to obstruct exploration. This would seem likely to lead to the observed effects of maternal overprotection: less trust in Nature, passivity toward 'her' yet, from suppressed curiosity, a will to escape her influence or ignore her.

9.2 Attachment to the non-human is a separate relationship

Since secure attachment to parents is clearly associated with diminishment of affection for nature, attachment to nature cannot be part of one (global) pattern of attachment. The only other option is that it is a distinct relationship (or class of relationships) in its own right, negotiated and maintained directly with the non-human.

That relations with the non-human are in fact attachment bonds is now accepted in respect of companion animals, there being too many parallels with attachment to humans to deny. For example, the death of pet animals is a significant loss of security and source of distress among most who possess them, and particularly for those like the elderly for whom

the pet may have been their ‘closest friend’. It is measurable and varies demographically: pet attachment is higher for adults in smaller families, urban residences, divorced adults, and those who mention a dog first when asked about their pets (Poresky and Daniels 1998), grows with child age (Melson, Peet et al. 1991) and strengthens with increasing loneliness and stress in older adults (Keil 1998).

That it is positive to have such bonds is also increasingly orthodoxy: Melson suggested that the childhood pet bond would promote healthy development through stress buffering, and positive influence on internal working models (Melson. 1989; Melson, Peet et al. 1991; Robin, ten Bensel et al. 1983). Work with juvenile delinquents has shown that pet bonds do influence internal working models, but not social development - it may be that other factors over-ride any benefits of pets (Brown 2000).

Similarly, people’s relations with their natural and physical surroundings betray many of the characteristics of attachment bonds. Setting up and looking after a garden ‘synergistically focuses several dimensions of attachment’ (Sime and Kimura 1988). Disruptions in place attachment after burglary, voluntary relocation and disasters parallel upheavals in sentient relationships (e.g. Speller 1999); strong pre-existing attachments are protective (Brown and Perkins 1992), and being dispossessed of land appears to have similar sequelae, encompassing not only the loss of familiar surroundings but usually material uncertainty and often, especially for agricultural and rural peoples, a major threat to identity.

Unfortunately, attachment literature by and large fails to acknowledge the potential significance of the non-human, including the non-animal. Even, as has been noted, the extensive place attachment literature appears to have failed to incorporate any recent advances in Attachment Theory. One up-to-date clinical listing of the possible causes of impaired attachment recognizes three categories:

- Caregiver factors (e.g. abuse, insensitivity, depression, immaturity including teenage parenting, substance abuse, prolonged absence, unresolved attachment difficulties);
- Child factors (e.g. prematurity, medical conditions, congenital problems, difficult temperament);
- Environmental factors (e.g. poverty, stress, violence, isolation, boredom, multiple caregivers) (Evergreen Psychotherapy Center Undated).

In comparison with the burgeoning volume of attachment research concerned with relations to humans, vanishingly little attention is given to affective relations with the physical and non-human environment – including clothing, food, toys, peers, animals, plants, climate, sounds and technology – which also clearly could carry psychological sequelae. Even the child's own body - including characteristics like physical strength or neuroticism – may matter. Exceptionally painful or happy events of any prominence can leave their mark.

In seeking a means further to characterize attachment to the non-human beyond accepted relations with companion animals, future workers could do worse than to adapt the schema put forth by Melson (1990), who identifies four dimensions of human-pet attachment relationships:

- Time spent with and activities directed toward the pet;
- Interest in and affect (feelings) toward the pet;
- Cognitive constructs developed about the pet and the relationship itself, and;
- Behavioural responsiveness to the pet and its needs.

By analogy, four similar dimensions of 'attachment to nature' might be conceived as:

- Time spent in contact with nature and activities in nature;
- Affective responses toward nature;
- Attitudes and beliefs about nature and human relationships with it, and;
- Behaviour when in or with nature.

Environmental leaders may believe they are driven by learned, cultural motivations that justify the wisdom of 'saving the planet' for future generations, but it is increasingly clear that they would be far less likely to subscribe to such aspirations if nature had been inaccessible to them as youngsters, or if they had not had an adult mentor who modeled easy familiarity with the non-human (Nixon 1997).

9.3 Humans normally dominate socialization, followed by animals

The main effects demonstrated in this sphere are known: having had more pets increases subsequent sympathy with animals, and greater human sympathy in adults is known to be related to their having children at home, which appears to align with the finding here of human sympathy rising with sibling numbers. The existence of a generalized capacity for empathy which overlaps between animal and human domains has also been hinted at (Paul 2000).

However the finding of falling animal sympathy with rising sibling numbers is, to this author's knowledge, new as is the possibility of an extension of the 'overlapping sympathies' notion to the environment in general, related to having had non-mammal pets. It seems that whether or not there is a generalized capacity for attachment, there is clearly a hierarchy of sympathies based on experience, in which humans over-ride animals, and lower animals are somehow experienced as equating to 'the environment'.

It also follows that the proposal of a 'menagerie effect', a strong overlap between empathy with siblings and animals, is disproven. It may be that in accordance with theories of peer group socialization (Harris 1998), constant peer company reinforces its own importance. Nevertheless there remain unexplained factors relating animal numbers to interhuman relationships: as children homeless adults had more pets than the non-homeless, and are more attached to them as adults. It may be that troubled families adopt larger numbers of pets, or that families with more pets become troubled (Kidd and Kidd 1994).

There does seem to be what might be termed a 'weak menagerie effect', in that having encountered progressively more animal types relates to diminishing fear of nature and dismissiveness of nature with, as has been noted, a 'dip' corresponding to the first animal encountered. This might be explained as the challenge of encountering non-human 'otherhood' (or viewed from an ecocentric stance, breaking through barriers to what has been called 'ecological selfhood'). The potential here for a parallel with the phenomenon of resilience is noted.

9.4 Exploration engenders nature security, assuming freedom from constraint

As has been shown in the first part of this chapter, there is a relationship between a childhood history of frequent playing and wandering with increased security in and reduced fear of nature, and greater sympathy for the environment. Having had a favourite place in nature also relates to nature security. Children who are given or assume the freedom to play and establish a favourite place (e.g. 'dens') far from home appear to learn through direct contact to feel comfortable there.

Two critical factors seem to be opportunity for exploration, and the child's and parents' personalities. In consequence, the more rural a child's upbringing, the more likely they would have been able to wander freely; the closer they were to farming, the more utilitarian and technocentric becomes their outlook. The child's personality is surely likely to influence their desire to explore. But, as we see in the next section, the relational style of parents can overshadow the child's desires: overprotection can obstruct exploration; too much care seems to relegate nature to the periphery of the child's awareness. Conversely a little of what might be termed 'benign neglect' (or in other circumstances, trust) frees (or forces) the child to befriend the non-human. Further work is needed to tease apart the relative contributions of exploratory or confident child personality and parental control; it is surely a dialogue. Either way, freedom to explore seems pivotal to the child's relationship with nature.

Since a dismissive attitude to nature rises with play frequency and a stoic attitude rises with frequency of wandering, it is tempting to speculate that early encounters with 'intimate' nature (as playing near home will always precede wandering further) allow the child to develop confidence with and then a blasé attitude to the familiar non-human, and the act of journeying, becoming familiar with and establishing their own place (i.e. selfhood) in the world allows a child increasingly to adopt a matter-of-fact acceptance of unfamiliar nature.

It seems clear that however we relate to places, we do so through more than mere fearfulness or lack thereof. As children, most of us latch on to a place that provides sensate stimulation, concealment, physical challenge and a fruitful situation for creative play. These places are imaginatively, sometimes collectively amongst a play 'gang', sculpted and absorbed into our sense of self and identity, providing meaning which is not a mere reading of the environment but an expressive dialogue within and *about* it (Sobel 1991). As attachment to other people is both person-specific and a generalisable pattern, so it seems attachment to place is place-specific but, once established, can extend and set the tenor of

affective relations to place more broadly. Chawla (1986) appears to have accessed these feelings when examining autobiographies for evidence of early environmental memories (Table 9.1).

As can be seen from this classification, the quality of place which impresses a child so strongly that years later it conjures up such clarity of emotion is not necessarily only its safety: it is also at turns the emotions of elation, pleasure, loneliness, rejection and absence it may excite. Whilst this author sees no mention in Chawla's work of attachment theory, there are inescapably strong echoes throughout this classification of the subjective experience of human attachment behaviours. Therefore, if we assume for a moment the possibility of a global nature attachment style parallel to global human attachment style, we can propose the fourth column as a tentative scheme of 'nature attachment styles' that these feelings represent.

Place attachment-based behavioural patterns probably carry through into adulthood. The attachment system exists to provide security through caregiver proximity, the exploratory system to discover the environment. Since a secure base facilitates exploration, the systems are complementary. So, just as play provides opportunity for exploratory behavior among children, and work does for adults (Hazan and Shaver 1990) (and we have seen herein that vocational choice relates to childhood nature access), so – obviously – adults display exploratory behaviour in leisure activities. The anxiously attached avoid thrill seeking, valuing love over leisure; the anxious and avoidant engage in leisure to gain social approval and regulate negative affect about relationships (Carnelley and Ruscher 2000).

Turning finally to the motivations for exploration, it is evident that a desire to become familiar with our surroundings is of survival advantage – today but more so in our primæval environment of evolutionary adaptation (EEA), whose genetic consequences we bear. This constitutes not predetermined qualities but a dynamically interactive set of tendencies or predispositions. Some of these are low level and strong (e.g. tissue differentiation); some low level but weak (e.g. segmentation, which can sometimes be switched by a single gene); some higher level and strong (e.g. the visual system), and; some high level and weak (e.g. individuation/self-realisation?). What might be termed 'territorial intimacy' is clearly higher level, but may not be weak: it is a universal subjective experience of even city dwellers that familiarity makes a new neighbourhood increasingly easy to navigate. It may not be unique to humans: certain animals like Red Deer seem to evolve a collective distributed awareness of their shared habitat.

Form of environmental autobiographical memory	Description	Descriptive terms included	'Nature attachment' style?
Transcendence	Memory of a dynamic relationship with the outer world, of a profound continuity with natural processes. It transcends social consciousness through a feeling of one-to-one communion with the environment. It often inspires long descriptions richly evocative of all five senses, detailing everything in the setting. Most commonly, it involves elation, a sense of exuberance or enveloping calm, of timelessness, boundlessness, and radiance. Occasionally, fatalism must be distinguished: a chilling, searing glimpse of nature's monstrousness which consumes life as prodigally as it creates it.	Transcendence Free(dom), space, excitement, adventure, risk, discovery, joy, belonging, wonder, awe, magic, bliss, wholeness, peace, tranquillity	Secure?
Affection	Memory of places to which we trace our roots, which are associated with happiness and security. It incorporates social definitions of the environment, and there is a parallel between the warmth of feeling for the place and for the people in it. Catalogues of everything in the setting are common.	Affection Relaxation, enjoyment, pleasure, contentment, security, safety, 'home', laughter, fun, happiness, friendship, loved, liked	Secure?
Ambivalence	Ambivalence results when identification with the place in which one is rooted (is) complicated by the tension that it represents family weaknesses of social injustices. Often the dominant culture devalues this place. It cannot be rejected because it is where one's personality and perspective developed and there are ties of affection to it, but neither can it be comfortably embraced.	Ambivalence Mixed feelings, loneliness, isolation (where not highly content), sadness	Preoccupied ?
Idealization	The person identifies with an environmental abstraction rather than a concretely live-in place. It may be a geographic region, as in patriotism, or a realm of the imagination. This mentally inhabited world becomes an intensely felt symbol for personal desires and values.	Idealization Idyllic	Dismissive?
Rejection	The environment represents a place to escape from. It fails to meet basic needs. It may be rejected for what it actively contains – because it is dangerous, filthy, or chaotic, or for what it lacks – because it is barren and unchallenging or foreign and alienating.	Rejection Fear, terror, vertigo, scared	Fearful?
Detachment	Detachment occurs when few words of feelings are invested in environmental description. The environment is referred to in order to locate life events in time and space, but it is a flat backdrop in scenes in which the actors occupy center stage.	Detachment No emotional terms mentioned	Preoccupied / Dismissive?
Omission	The physical setting is not described at all. The location of events must be inferred from scattered allusions.	Omission No reply, can't remember	Dismissive/ Preoccupied ?

From (Chawla 1986, 37), with additions

Table 9.1: Characterisation of environmental memories

Donald (2001) maintains that with the progression of non-Darwinian (i.e. cultural) evolution, the human mind increasingly stores 'knowledge' in both the collective understandings we share and the objects and environment we construct. Humans are so peculiarly successful precisely because human consciousness is partly embodied outside our brains. He seems to maintain that this is entirely dependent on interpersonal exchange or dialogue only with the products of human endeavour: but the non-human remains ever present. All cognitive development takes place under the influence of external factors, mediated by the organism's heritage of sensory organs, behavioural repertoire, mental life and culture. The qualities of both the EEA and the environment of individual adaptation (EIA) leave their marks on each of us. Our ability to interiorise and make sense of the textural and topographical complexity of the external world *must* piggyback on an ability honed over millennia to do this in relation to our natural primaeval surroundings, nature.

Hence we arrive at the idea of 'situated cognitive development': no organism can develop, as species or as individual, in isolation from an environment. Donald presumably means to incorporate experience of place as a building block of consciousness, and our EEA 'place' is certainly not anthropogenic. We know that individual's place awareness and brain anatomy is changed by exploratory behaviour (Maguire, Gadian et al. 2000). It is therefore a modest step to accept that collective human consciousness (and therefore that of other sentients) is place-dependent. Culture mirrors (i.e. builds 'on' or 'in') place.

9.5 Parents can constrain play and wandering, or facilitate nature security

It is impossible to be certain that subtle or overt parental controls or sanctions do not play a larger part in shaping child play and wander behaviour than this analysis can reveal: children may believe they have more freedom to choose than was in fact the case. Even noting that, it is clear from the evidence herein that the child who is able to wander far from home is the classic 'nature secure' individual (and that vocational choices may relate to this quality in a wider range of groups than previously described). Few children, excepting those of the pathologically neglectful, would be able to do that without either parental sanction or deception. These options imply that the child either had parents who were sufficiently trusting to allow (or even encourage) independent exploration, or the child was highly motivated to evade parental controls for the sake of exploration. In the case of neglectful parents, the child would still be free to explore. Parents who successfully apply mobility

constraints (probably against the child's will) seem to affect the child's later attitudes to nature (curiously, there is an example in the animal kingdom which parallels this hypothesis and the implication of deleterious effects of confinement: attachment to place in birds (juncos) has been shown to be dependent on living freely, rather than mere captive residence (Nolan and Ketterson 1991)). In all cases it can be seen that the attitudes of and controls operated by parents' impact on the child's likelihood of free exploration. Further work is required to distinguish between the relative importance of exploratory or confident children and of parental controls; clearly, there is a dialogue between the two.

What evidence has been gathered relating to proactive adult facilitation of contact with nature underlines the importance of this facilitation. Having had a nature mentor relates to reduced anthropocentrism (one is tempted to speculate that this could be because the child learns how nature-unfriendly are other humans, although the opposite option that it could be down to not liking the mentor has to be admitted!). However since nature media encouragement appears to facilitate animal sympathy, the former explanation is more likely: that the adult who offers the child the opportunity for practical interactions with nature in a emotionally positive context is helping create a young environmentalist.

9.6 Vicarious nature satisfies some needs, but may not replace reality

Just as there may be a universal human propensity to fabricate personalizing systems of explanation for events – religion (Milton 2002, Chapter 1) – so there may be a tendency to get to know our place and its inhabitants, and to create a safe place within it. Children exhibit 'nesting' behaviour when they find and construct favourite places. But what of children whose nesting behaviour is frustrated? Even ferociously anti-religious communist states have signally failed to extinguish religiosity. In the absence of real nature, do children seek imaginative connection with the non-human?

Clearly children in general seek to relate to a favourite imagined place – an interest that increasing urbanization does not appear to have diminished. They are enthusiastic about imaginative connections, including nature hobbies and consumption of nature-related media. We have shown that in common with direct nature experience, nature hobbies and media draw children into connection with the natural and to some extent away from the human world: hobbies relate to greater environmental sympathy and nature secure, and lower human sympathy, and; nature television reduces nature dismissive and anthropocentrism,

and also raises nature secure. But just as films and stories about parents may educate about but cannot replace the experience of parenting, vicarious representations of nature are in some sense different, perhaps appealing more to the intellectual than the affective faculties, and certainly in the case of nature broadcasting are consumed passively and usually require no practical action.

The unanswered questions remain: which kind of nature experience do children prefer, real or vicarious (and when and why)? And, since imagination and reality are known to be handled by different parts of the brain (Salisbury 2002), and fantasy proneness at least partially mediates the relation between insecure attachment and psychopathology (Wheeler 1999): what are the effects on the brain and its health of declining contact with real nature and its replacement by a vicarious version? Again a re-analysis of this data to compare the effects of high real-low vicarious and high vicarious-low real nature contact may throw light on this.

9.7 Poor attachment can lead to displacement of needs onto the non-human

Modern industrial civilization is putting severe and increasing strain on parent-child relationships. One in five British children complains that their parents are too stressed to make time for them; one in ten that they are pressured to live out the parent's frustrated ambitions; parents are away from home outside working hours in two thirds of families (Summerskill and Brownell 2002). One wonders if the alleged 'sentimentality' of urban dwellers about nature is a consequence of the increasing distance between people.

Can non-human attachments compensate in any way for inadequate human bonds - ameliorating anxiety and perhaps breaking through avoidance in childhood – and thus have lasting effects into adulthood? Psychotherapist Judith Herman (1992, 107) believes that at age seven or eight, abused children often seek out a safe hiding place, being 'more dependent than other children on external sources of comfort and solace'; many anecdotes echo this (Shaw 2000). Certainly, at an extreme, excessive pet keeping ('animal hoarding') is known to be linked to delusional and attachment disorders, hoarders often having stronger bonds to their animals than to any human (Tryba 2002).

From the evidence produced here, it appears that children may establish stronger relations with nature in reaction to faltering human attachments. What could be termed 'reactive' or rejective environmentalism seems to be built on rejective (absent or weak) parental bonding,

and therefore by implication the search for a substitute in nature. Children who experienced low maternal care are less nature dismissive, and overprotective mothering is associated with having a favourite place away from home, suggesting that such children are both driven away by an anxious tendency to over control and displace an under satiated need for understanding onto the non-human (this author has many times heard the accusation that particularly over-enthusiastic environmentalists who work themselves to burn out trying to 'fix' environmental problems or 'win' campaigns are 'playing out their problems on the world' – though supporting empirical evidence has not been forthcoming). Equally, the importance of nature rises when a child experiences 'place rejection' and has to move home. It would be interesting in this context further to consider what the common but harmful sub-abusive behaviour of intergenerational transmission of rejectiveness of pets (being hit or being given away) might imply – although it is not related to attachment (Raupp 1999), or the psychological affects on children of destruction of nature (Shaw 2000).

In the spirit of considering the issue from the opposite direction, it is likely that – given our evolutionary heritage of small bands wandering the savannah – constant place displacement and hence stronger connections than most urban humans now have with real nature have been the norm. Sanity, in the sense of being optimally adjusted to our surroundings, is likely to have been based on sufficient and appropriate familiarity with the non-human. In this light, contemporary high expectations of close and exclusive interhuman bonds could be seen as a narcissistic stance that fails to acknowledge our fellowship in the larger family of life. In short, anthropocentrism could be defined as a delusion brought about by human overcrowding.

9.8 Theories of attachment and environmentalism may require modification

Children are curious. Pre-equipped with the motivation to interact with both sentient and insentient surroundings, from birth they engage with the people, animals and inanimate objects they encounter. Especially rewarding interactions that reinforce the experiential pleasure of being alive, embodied and in relation are pursued.

Attachment theory accounts for a core level of valuation of self and other, which continues to be critical throughout life. As originally conceived, it argued that the child's first relationship sets a pattern that is carried into all later relationships (Lewis and Feiring 1991). But attachment also occurs in a framework of multiple relationships, and is more of a

contextually dependent capacity than a trait (Lewis 1994). Having established a ‘secure base’ from which to explore, successive but less intense attachments are normally made with father, siblings, relatives and beyond; but if the first secure base fails, another is sought. Such is the internalization of the experience of the secure base that not only real but also imagined encounters with supportive others - even among the insecurely attached - activate feelings of security (Mikulincer and Shaver 2001). Most people have multiple attachment schemas and may even develop relationship-specific attachments which differ from their global attachment style (Mikulincer and Arad 1999; Pierce and Lydon 2001).

Neonates may in some sense be aware that they are interacting with something like themselves, by definition implying that they are also aware of things not like themselves (and though this awareness may be learned, the fact that it is evident very early suggests otherwise). The less similar are these things, the more they fall into the category we call objects, and the more the infant needs to check out or triangulate their perceptions with the reactions of a companion. The basic awareness may be present at an early stage, but clarity in this distinction is surely greater from an adult standpoint.

The enthusiasm for relating is undoubtedly natural, the mechanisms which drive it particularly attuned to interhuman relations. But to the newborn, things do not fall cleanly into categories of either ‘objects’ or ‘other persons’. If one’s view of sentience is of a diffuse hierarchy in which humans are unique or outstanding in certain respects but to varying degrees share other characteristics with other life forms, then it could be that whilst children are pre-equipped to recognize and affiliate with certain telling qualities of fellow humans (or even a ‘virtual other’ (Braten 1992) awaiting refinement from experience), some of these ‘templates’ may be ‘fuzzy’ and for characteristics which are more widely shared. As evidence from the adaptability of feral children suggests, infants may latch onto the closest available human-like source of responses, human or not (Candland 1993; Newton 2001). Children do indeed appear to have innate but only partly accurate ‘folk biological’ ideas about other life forms, which are modified both quantitatively with increased knowledge, but also qualitatively as they come to understand phenomena like contagion and inheritance (Coley, Solomon et al. 2002).

That the net is cast much wider than exclusively human company may not be completely accidental: it may perhaps be for evolutionarily useful reasons. Familiarity with conspecifics is of course the priority in the young infant, for reasons of survival. But in primaeval surroundings acquaintance with the wider world and the ability to make independent judgments about what was threatening and what useful would as independence necessarily developed have been progressively more critical for self-preservation. It is still so today. The domestication of animals was no accident.

9.8.1 Beyond mother-infant attachment

Theory as it stands conceives of all attachments as in some sense lesser versions of the main, (ideally) mother-infant one, and the need for attachments is subject to a threshold: the child requires to experience a certain level of success in human attachment and, providing its need is met, the experience is internalized and the child is able to move on to engage with other humans with whom there is an attenuated need for attachment (Bronfenbrenner 1979). I take issue with two implicit assumptions that:

- Attachment occurs only with other humans, and;
- Humans alone fulfill attachment needs.

The evidence that human attachment does not end with humans is overwhelming. A simple version of this objection is by now well supported, through the extensive work that has been undertaken with respect to domestic pets. It is beyond dispute that children (and for that matter adults) form attachments of some description to domestic animals, and also the reverse: animals form attachments to humans.

My objection is more profound. Animal relations are universally sought and valued by children, their quality seemingly primarily related to the animal's place on the phylogenetic hierarchy. So, too, are relations with what is conventionally characterised as non-sentient: lower animals, plants, flowers, trees, rocks, caves, and cliffs. Beyond that, children notice, accept and enjoy the weather and the landscape as, effectively, a matrix (Pearce 1992) in which their existence is forged, as 'mother nature' (and in some cultures, father too). Experience of each aspect of the non-human leads to empathy with it. Adults maintain these propensities, for instance with attachments to non-domestic (e.g. farm) animals (e.g. (Vitterso, Kaltenborn et al. 1998); perhaps even to intangibles like cultures and values. (Whether these sorts of attachment occur in reverse is perhaps a question best asked elsewhere, although there is good evidence of, for instance, mourning among pets and some suggestive and circumstantial evidence at least for emotions of attachment and loss from other sentients, e.g. Goodall (1996). This overall pattern of attachments to things, places, companion animals, ideas and beliefs, alongside people-to-people attachments, has been called the 'attachment structure' and as such provides important sources of security, belonging, and self-identity (Cookman 1996). Being attached to all living beings has been described psychoanalytically as 'being at home in the world', which 'symbolizes an

archetypal intent to invest kinship libido in people, animals, and objects' (Hill 1996). Recall the primary attachment principle that 'other' becomes part of 'self' regulation (i.e. libido) and well-being.

Attachment relations may be self-organising, on a unidimensional hierarchy of distinctions between most like and least like self. In children's drawings of self and others, they appear by middle childhood spontaneously to have reconstructed a phylogenetic hierarchy of relatedness, such that cats, dogs, caged and farm animals are placed closer to the self than fish (Kidd and Kidd 1995). What remains to be demonstrated is the dynamics of the establishment of the constellation of relationships, in terms of the human-nonhuman distinction and in terms of individual differences between children's personalities.

9.8.2 Complexity of attachment

Unfortunately attachment is not as simple as a unitary phenomenon whose intensity may rest only on the single dimension of degree of likeness. There are definitely two, possibly three (Cox, Enns et al. 2000; Murphy, Brewin et al. 1997), and perhaps more dimensions or factors. 'Attachment' may in fact be convenient shorthand for something that on closer scrutiny fragments into a multifaceted phenomenon (e.g. Rutter (1981) on dimensions of security and its sequelae). For psychological health the child must have a 'good enough' experience of each. Where a mother may, bringing up the child alone, convey her own positive and negative idiosyncrasies to the child, the introduction of a father figure, and then others, is 'protective' for the child in the sense that it is likely that these 'others' have complementary personal qualities and are therefore more likely to match minimal standards in several dimensions. This to some degree accounts for the phenomenon of resilience (and the unfairness - for mother and child - of unsupported motherhood).

One thrust of this thesis is, however, to question psychology's pervasive anthropocentrism, and examine the value of a greater awareness of the non-human as not merely a source of convenient, potentially extensible models for human functioning, but also as the ongoing evolutionary context of human (cognitive, emotional and behavioural) development. Without an understanding of how we interact developmentally with *everything* that is salient to us, we cannot claim to have a rigorous understanding of why humans are as they are; and we cannot explain those things without the fullest bio-historical understanding of how we came to have the genetic, physiological and psychological make-up we do have.

Attachment is about adapting to one's environmental circumstances. It also has an often-unacknowledged normative component: we seem without demur to have accepted today's nature-deprived urban people as 'normal.' But:

> *'... clinical psychology's portrayal of the statistically normal present-day configuration of selfhood as 'natural' and healthy rests on an ahistorical perspective that is blind to the way current styles of subjectivity have been caught up in the industrialist transformation of the world.' (Kidner 2001, 69)*

Just as there is 'good enough' experience of human parenting so there may be a 'good enough' experience of non-human environment, sentient and non-sentient, emotional and physical. It is tempting at this point to call forth a concentric circles model of attachment but this would be an oversimplification for several reasons: one being that attachments to infants are reciprocally co-constructed phenomena within the family environment (Bell, Paul et al. 2000). At very least we must imagine overlapping concentric circles (and interference patterns) of ripples from multiple stones dropped into a pond. In fact, research is underway on the complex systems-relational experience of attachment formation within the family (Lewis and Granic 2002).

If it is correct to accept non-human attachments as valid, then it ought to be possible to show, as was done through the praiseworthy detective story that unearthed attachment as we understand it today, distinctions between individuals subjected to differing non-human circumstances and, tracing those individual's personal histories back in time, we should be able to achieve some level of confidence in predicting the effects that particular sets of circumstances have.

For instance we might ask: is the degree of closeness a child experiences to its pets an instinctual, almost 'ontogeny recapitulates phylogeny' replaying of some mechanism by which the less sophisticated child's mind seeks out complementary minds of a suitable level of complexity with which to interact? Does the degree of closeness a child experiences correlate with its attachment status? With the attachment status of the pet? Aware that a desire to develop attachments to the non-human may be driven in part by failed human attachments, does the nature and strength of this desire vary according to individual personality and upbringing? Or is there some universal structure of interspecies relatedness, a coevolutionary legacy between domestic (or all?) animals and humans (or between some or all animals – a physio-psychological parallel to symbiosis) that leads to the establishment (or maintenance?) of networks of cross-species attachments, independent of human-human attachments? If we are born with Braten's 'virtual other', why not a 'virtual world' too?

Analogous to the long-running dispute over intelligence quotient as the single measure of intelligence versus a theory of multiple intelligences, might there be a general attachment capacity and numerous specific capacities?

Since one can have psychiatric 'dissociation' from one's body and experience (a syndrome linked to problematic attachment) as a result of early shock precipitating withdrawal into fantasy life, can one have 'nature dissociation' from living in a shockingly artificial environment, which drives one to watching Disney cartoons, sentimentalizing about nature, but being fundamentally fearful of it? (Fear of nature being a documented phenomenon in urban children (Bixler and Flood 1997).) Can one be 'nature resilient' as a result of having had a good relationship with nature in childhood, which somehow 'protects' against 1) anti-environmental behaviors as an adult and 2) bad human relationships in adulthood. Or do nature lovers have such bad (or distant?) relationships because though they learned to get along with something, it was not humans and they do not know how to handle them?

9.8.3 Dimensions of attachment to nature

This seeming avalanche of questions arises because the boundaries of attachment theory are not firm. If attachment is indeed (a foundational part of) what we experience in relation to the non-human, then attachment theory as it stands is inadequate and requires formal extension to incorporate the need for and consequences of relations with animals, plants and places. If – as some would certainly object – this is to stretch the meaning of attachment theory beyond breaking point, then what exactly are the boundaries of attachment? Is there some unstated additional factor – humanness, or sentience perhaps – that must be added? What does it mean subjectively, clinically, to be attached to something that is insentient, even intangible? If the consensus is that whatever is happening in these situations is not attachment, then do we need another, new theory to describe what happens in human-nature relations?

In the former case, attachment alone can at best capture only one – albeit fundamental – level of human-nature relations. This thesis has examined only that part, conscious that we interact with nature in many other ways mediated by for example social motivation, communication, and culture. But these come later.

In contemplating such a theoretical revision, the reader might ponder where and for what reason(s) to settle on a hierarchy of progressively wider conceptions of attachment:

- Attachment is a *metaphor* for relations with nature: i.e. our behaviour and models of non-human others *appear like* we are attached as with humans, but since these relationships do not meet the criteria that distinguish attachment from other types of relationship, it remains a metaphor. (Actually, they may be met, if contact with the non-human is a necessity for healthy growth, engenders insecurity from detachment, involves proximity-seeking, adoption of characteristics of the caregiver and internal working models, conforms to relationship-specific attachment security, creates an enduring attachment style, has predictable sequelae of poor attachment, and life span effects);
- Attachment to the non-human is a reality, but it is a spill-over of attunement to the human 'other' (but attachment of humans to individual *pets* is accepted, and this work strongly suggests that attachment to non-animal nature is also relationship-specific and based on responses to and engagement with non-human idiosyncrasies);
- We are attached to other sentient animals, but it ends there (but attachment to *place* is fairly well established);
- We are attached in varying degrees to *all living things* (c.f. the Biophilia hypothesis). The propensity for this seems at least probable (but we would rigorous need tests other than those for interhuman and companion animal attachment to be sure).
- Attachment behaviour, being demonstrated in a wide variety of animals to kin, other species and place, is a universal of relationships with *everything* that is emotionally significant to sentient beings. (Perhaps, but does this threaten to render attachment theory meaninglessly broad? No, but it does beg the case for deconstrucion of it into baser elements including safety, trust, joy, acceptance, empathy, etc.)
- Attachment is, echoing an eastern religious position on consciousness, a fundamental quality of *all matter*. All things are attached to all things. (Numerous possible countervailing arguments include: the assumed hierarchy of consciousness based on activity regulated by a central nervous system; the inability of rocks to act, 'feel' or respond; the immobility of trees, and; the propensity of humans to read sense into random static patterns (e.g. Rorsach blot tests). Essentially this is a theological position widely held in indigenous cultures but untestable by scientific method.)

Furthermore, one might logically ask how we might test for 'attachment to nature'. From this question intriguing possibilities flow. Before the modern conceptualization was settled upon, a lack of grounding in empirical evidence prevented human attachment theory from gaining wide acceptance from some psychologists. The breakthrough that surmounted that problem was the development of the Strange Situation procedure, which provided a repeatable, behavioural assessment of attachment status. Some years later, the evidence that procedure furnished fed into Bartholomew's (Bartholomew 1990; Griffin and Bartholomew 1994) proposal of the four-category model.

9.8.4 A model for a General Theory of Attachment

Comparing that four-category model with the four ecoemotionality scale categories, there is an inescapable echo of human attachment in the latter. If we then map these ecoemotionality factors onto Bartholomew's two-dimensional human framework, the possibility of an at least two-dimensional nature attachment typology (with the axes relabeled as seems most fitting for internal working models of other humans and nature) begins to seem appealing:

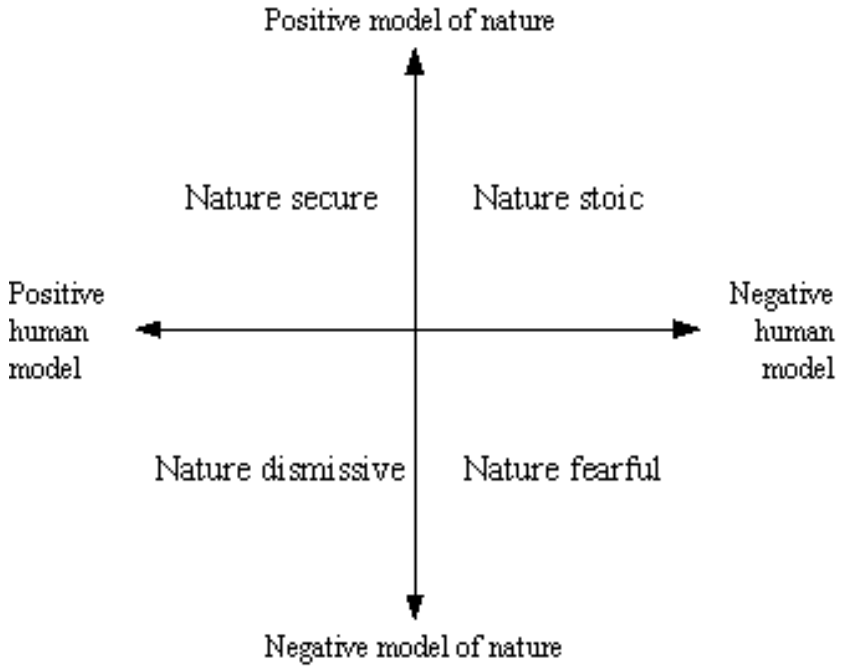


Figure 9.1: Proposed four category model of nature attachment

Of course in order to make this four-category model meaningful, we must postulate that we possess an internal working model of nature, a new departure but one that follows the logic of attachment to nature constituting a genuine relationship.

Working backwards by analogy from this proposed model and comparing the relationship of the four-category human attachment model to the Strange Situation procedure, one might reasonably ask whether it might be possible to design (or observe) an analogous *behavioural* test for nature attachment. Principal components analysis of the data for outdoor recreation (the complete examination of which has been held over to a later stage) produced 'outdoorsiness' factors termed 'at ease' and 'loner', again to some degree redolent of attachment-like behaviours.

Could it be that a self-report (or observational) test of a person's outdoor recreational behaviour reliably betrays their inner attitude or state of nature anxiety and avoidance? People are known to experience ambiguous emotions about nature, including both attraction and anxiety, for example in the case of urban woods (Burgess 1995), where people's entire lives are played out within a forest (Kenrick 1996), and cross-culturally (Anderson, E.N. 1996). Certainly 'secure base' behaviour is known to occur in adulthood more generally (Crowell, Treboux et al. 2002). There is curiously suggestive evidence that there may in fact be something to this case in the intercorrelations between the behavioural (outdoorsiness) and attitudinal (ecoevaluations[27] and ecoemotionality[28]) scale factors.

From a source unconnected to attachment theory comes another possible clue. Beckman (Undated) revised Douglas' model of 'thought styles'[29] to apply to attitudes to nature (Douglas 1996; Keller and Poferl 1998). The four proposed thought styles characterize nature as, respectively, benign, tolerant, ephemeral and capricious, yet again seeming to carry echoes of the four attachment categories.

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[27] There is a tantalizingly close to one-to-one relationship between ecoevaluation and outdoorsiness factors: Conservationist correlates only with at ease ($p < .05$); Loner only with ecocentric ($p < .01$); And pragmatist only with technocentric ($p < .05$); But utilitarian correlates with no ecoevaluation factor (analysis of outdoorsiness factors is outwith this work; contact author for details).

[28] At ease correlates with secure and stoic ($p < .01$) and dismissive (negative) ($p < .05$); Loner with secure and stoic ($p < .01$), and negatively with dismissive ($p < .05$); Utilitarian with dismissive and fearful (negative) ($p < .01$); And pragmatist with dismissive and fearful (negative) ($p < .01$) and stoic (negative) ($p < .05$). Overall outdoorsiness score also correlates ($p < .01$) with both secure and fearful (negative), but not with dismissive and stoic, indicating that the latter two factors may be at opposite ends of a scale of 'nature avoidance' (analysis of outdoorsiness factors is outwith this work; contact author for details).

[29] Created by Douglas for the purpose of capturing overall attitudinal orientations to experience.

Is it possible that this stylization has unwittingly described 'nature attachment' categories? There is no empirical evidence for this, but the temptation to at least attempt a speculative 'best fit' of both Beckman's styles and the scale factors derived from this study onto the proposed model is too great for this author to ignore. Taking into account all the known relationships, personal judgment alone would suggest the following:

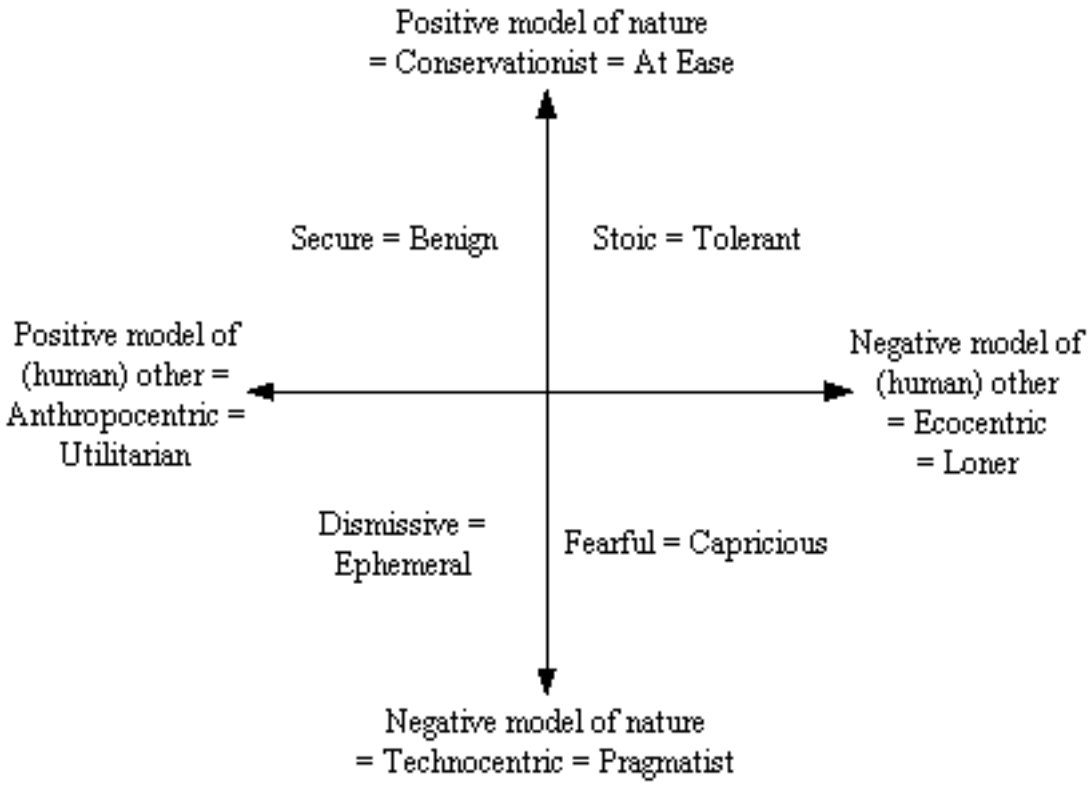


Figure 9.2: Possible nature attachment model incorporating derived factors

At this stage this model must be seen as highly tentative and based on narrow (and incompletely examined) evidence. It immediately calls forth problems (e.g. the fit corresponds to most of the known relationships between factors, but some relationships are contradictory[30]) and is proposed with a degree of uncertainty (for instance, partial rotation of certain of the axes may offer an improvement), but that is not to say it may not be a useful basis for subsequent research into human-nature relations.

[30] E.g. both *at ease* and *loner* correlate positively with *secure* and *stoic* but negatively with *dismissive*, and; it is not surprising to find ecocentric loners having the most negative model of humans, but this position equates to an intermediate better model of nature – surely ecocentrics would have a highly positive model of nature?

If we accept however that an attachment mechanism may indeed apply in respect of the non-human (and therefore a model of this kind would be required), how might it relate to the established two-dimensional model of human attachment? We have seen evidence for instance that secure (human) attachment and nature security do not seem to go together – the relationships appear distinct (i.e. not coincident). Here speculation is pushed to its furthest point in this thesis, for which there is *no* direct evidence: perhaps there could be a three dimensional interpretation in which attachment to nature becomes a third dimensional axis to human attachment. It may even be that, given the different attitudes that have been shown to arise from experience of mammals, non-mammals and the non-sentient, there may be more than three axes of attachment overall (but this cannot be represented in a simple diagram).

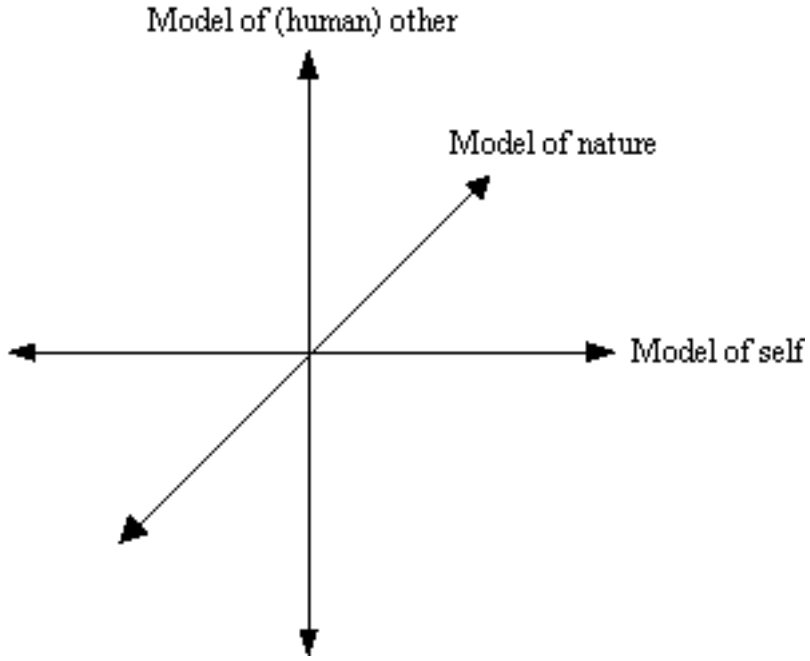


Figure 9.3: Speculative 3D model of human-nature attachment relations

Finally with regard to attachment, the notion of 'rejective environmentalism' has been proposed: that children suffering from overt or implicit parental neglect or abuse who do not have access to a human pseudo-parental replacement may turn to non-human satisfiers. One clue might lie in the fact that attachment to place and to people do not seem to correspond: Hess hypothesized that secure adults would tend to loving attachment to place, the preoccupied would idealize, the dismissing consider it unimportant, and the fearful would find the memories painful. An inconsistent pattern was demonstrated, though place in its

own right was found to be important to the development of a sense of personal security and identity (Hess 1998). If correct, 'rejective environmentalism' implies that there may be an innate minimal threshold for attachment, and the phenomenon may underlie some people's consuming interest in or close relationship with pets, outdoor recreation, gardens, natural history, botany or zoology.

It also reactivates the question of whether such stand-in attachment targets would constitute inadequate or pathological replacements, or whether this is a rational and healthy reaction to circumstances. Modern urban cultures may themselves suffer from a blanket pathological separation from nature: a longer term or cross-cultural perspective might suggest that a balanced personality would have an emotionally engaged relationship with both the human and non-human. It could also be counted as an intriguing hint of support for the biophilia hypothesis – the innate 'love of nature' (Kellert and Wilson 1993).

In addressing the potential for adding to or amending attachment theory with regard to experience of nature, a related but important question has been left aside. This research employed approaches to the measurement of environmental attitudes and values established over 20 years ago, which are still by and large accepted. The author included two different scales for environmental attitude measurement for a number of reasons, not least of which was that they apparently addressed different dimensions of relating to the environment.

Since the results obtained for ecoevaluations and ecoemotionality are divergent (in terms of both factors derived and the pattern of relationships between these two scales and other scales[31]), the perception that the two scales are not in fact measuring the same things seems to have been vindicated. The ecoevaluations scale seems on face validity to be measuring a more cognitive dimension of attitudes, the ecoemotionality scale a more affective dimension. We have examined the implications of this in terms of attachment theory but, to take a step back, how might these differing scales relate to their initial intent, which is to characterise environmentalism, and to the way we understand environmental learning?

[31] There is clearly an interesting pattern of relationships between the ecoevaluation and ecoemotionality factors, but it is far from a one-to-one correspondence. Nature secure correlates ($p <$ .01) with conservationist and ecocentric, as might be predicted; Nature dismissive correlates with anthropocentric, technocentric and negatively with conservationist (all $p < .01$); Nature stoic correlates with no ecoevaluation factors, but comes closest to anthropocentric ($p = .067$) - again perhaps to be expected; but perplexingly nature fearful correlates with anthropocentric, technocentric – explicable – but also ecocentric (all $p < .05$) and not conservationist – positively odd if the technocentric-ecocentric continuum is a correct understanding of the structure of environmental values (for full tables see appendices on CD-ROM).

9.8.5 *Environmentalism as motivation for learning about (attachment to) nature?*

What exactly is environmentalism? At one level, it is to espouse pro-environmental attitudes. Earlier it was suggested that in addition to the appropriate attitudes, a propensity to act upon those attitudes may also be characteristic. One incidental possibility is that 'environmentalism' equates to secure 'attachment to nature' status. But ecocentrism is not in the same location as nature secure in the possible nature attachment model above, which Thompson and Barton's (1994) work suggests it might.

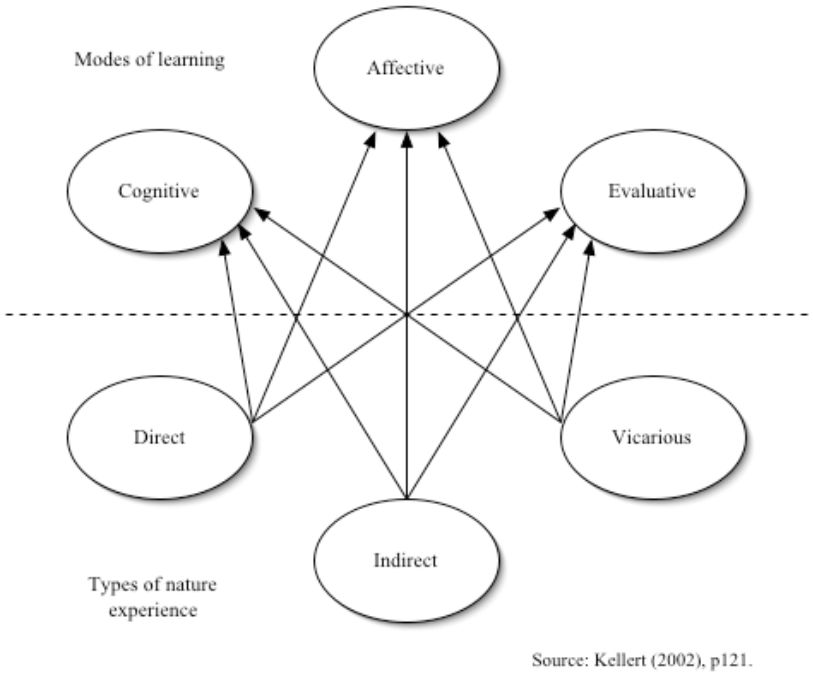


Figure 9.4: Types of nature experience and modes of learning

As this thesis was being concluded, Kellert (2002) published a diagram to describe the relationships between his proposed three types of nature experience and what he sees as the three possible modes of learning about nature. Whilst this diagram undoubtedly helps clarify the relationships, there appear to be two immediate problems with it. First, it seems perhaps inadvertently to suggest that all nine relationships are of equal value: this thesis and much prior work throw that assumption into serious question (and to be fair Kellert does in his accompanying text acknowledge 'considerable uncertainty … (over the) … functional and adaptive balance' of the different types of experience of nature in childhood). It also makes a point of separating out 'evaluative' learning from 'cognitive', and omitting behavioural (or habitual) learning entirely.

We know that ecoactive adults tended to have had ecopractical parents. There were clear and positive relationships between children's direct relations with nature - particularly independent exploratory behaviour - and ecoemotionality, but none between play and wander behaviours and ecoevaluations. It is known that adult attitudes are not always very reliable predictors of behaviour. What could account for this pattern of relationships?

Cumulatively, the evidence begins to hint at the possibility of differing mechanisms that would underpin the formation of affective, cognitive and behavioural orientations toward the non-human. It certainly seems on surface validity at least to accord with the known multifactorial structure of motivations for environmental behaviour (Bamberg and Schmidt 2003). It follows that environmentalism itself might not be unidimensional but in fact be a term used to describe a more complex multifactorial phenomenon (of perhaps three 'types' or 'dimensions') which Kellert's framework helps us characterise. Additional circumstantial evidence for this view comes from Bixler et al (2002), who claim that while childhood play in wild environments relates to more positive adolescent perceptions of and outdoor recreation activities in natural environments, it does not affect intellectual interest in environmental sciences or environmentalism.

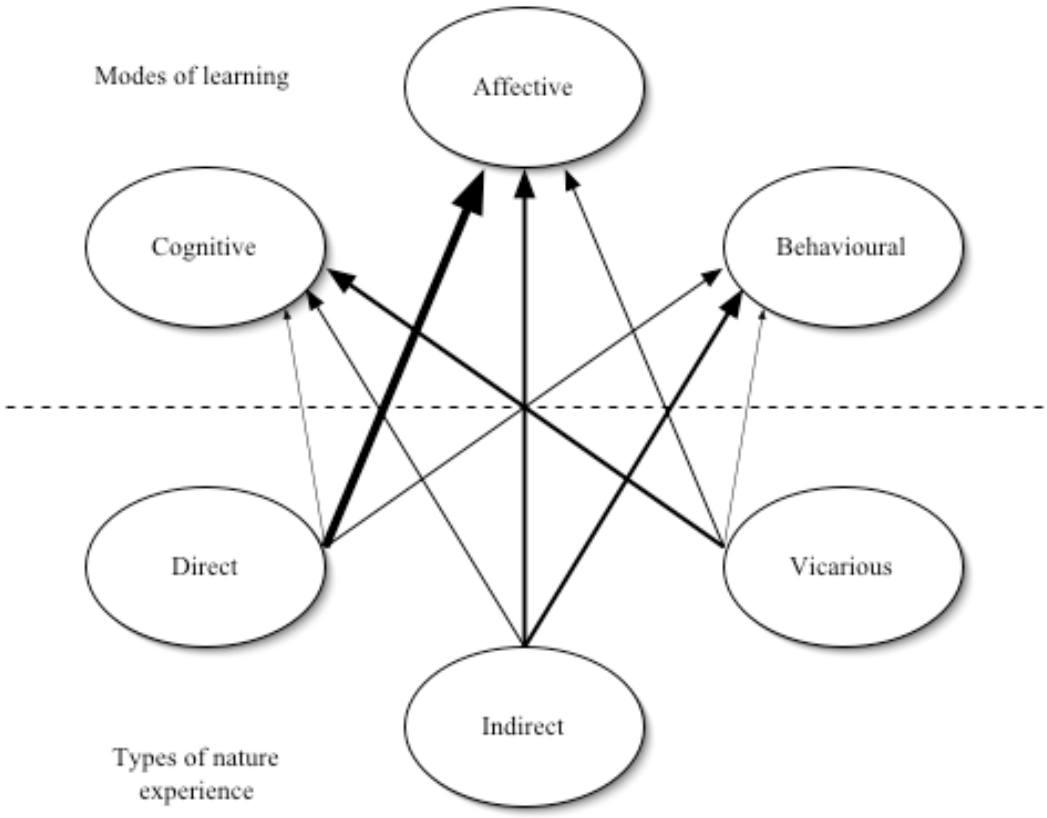
Direct ('ecstatic') childhood experience of nature would be the strongest influence of all, having its most significant impact on the affective domain but also tending to reinforce some behaviours (e.g. wandering in nature). The closely corresponding 'emotional', 'gut', or 'experiential' environmentalism would have a significant but lesser grounding in indirect experience and affective mentorship (i.e. adults who set a tone of confident, respectful interactions with nature). The balance between the two is unknown, but the former is unsubstitutable by either of the latter. It may be the only type of environmentalism that consistently motivates nature-friendly action without external reinforcement.

Indirect experience of nature such as interaction with highly controlled versions of nature (e.g. regimented gardens) and adult nature mentorship would be likely to have its greatest impact on the affective and behavioural domains. The most closely corresponding type of environmentalism would be the 'habitual', or 'mimic' dimension, which would be based on repetition of observed or performed routine including the practices of parents, peers and other role models. There is a suspicion that this may not be tied to any particular set of values. Thus a child whose parents were diligent conservers of physical resources might do the same in adulthood, without necessarily any strong opinions linking that behaviour to environmental reasoning.

Vicarious (i.e. the most culturally determined and factually-based aspect of) experience would have its greatest impact on the cognitive dimension, but would also have a lesser

impact on the affective (e.g. reading about anthropomorphized animals in books). The corresponding cognitive, 'intellectual' environmentalism would be marked by early and persistent pursuit of 'information' and (arguably) relationally disengaged 'study' of nature. There is some suspicion that this would occur more often in individuals who are dissociated to some degree from themselves or others.

This author would therefore make a number of changes to Kellert's original to produce a diagram that more accurately reflects these notions. Firstly, evaluative learning (the development of 'values, beliefs and moral perspectives') is more conventionally regarded as a *product* of cognitive, affective and behavioural learning than a separate category of learning itself: hence, evaluative learning would be replaced by behavioural learning. Secondly, the arrows indicating influence of experience on learning would be given a weighting (thickness) to reflect their potential significance or power, given the suggestions above and the various pointers in this thesis.



Source: Hill (2003), after Kellert (2002).

Figure 9.5: Revised relationships between nature learning and experience

This diagram is merely a convenient graphical presentation of some ideas about the overall comparative importance of the three modes of learning: it does not address the questions of how their relative significance might vary with time, or how these ideas might relate to the revisions suggested above to attachment theory. It reiterates, however, that given that direct experience is probably the strongest influence on learning about nature and in particular seems to affect the affective domain perhaps, after all, genuinely active environmentalism is rooted in direct nature experience.

9.9 Conclusions: What was intended and pulling the strands of theory together

Plenty of research suggests influences and mechanisms of attitude change in adulthood, but more often than not it fails to identify why attitudes are as they are in the first place. Underlying the basic personality orientation of adults in many areas of relating in general is early experience. The limited work that has been done on the sources of these values in respect to relations with the environment points to some of the factors I have examined. This research confirms quantitatively that multiple childhood influences contribute to adult attitudes to nature, including in particular both the influences identified previously as most important in Significant Life Experiences research - spending time in nature, and parents. Hence it can conservatively be concluded that these factors are indeed pre-eminent in shaping environmental values, and that they are related to other values held by adults in relatively predictable patterns.

The justifications for carrying out this thesis included clarification of the degree of correlation between the various influences and outcomes, and the working out of novel theoretical implications and finer distinctions that others may productively follow; the testing of new instruments for investigating this field has been a potentially useful spin-off. Specific questions have been clarified regarding the influence of: direct, indirect and vicarious contact with nature; principal caregivers/close others, and certain broader sociocultural factors including media. In particular, the 'headline' conclusions reached suggest that:

- Attachment to nature exists distinct from human attachments;
- Independent exploration is critical to its establishment;

- Parental attachment relations can facilitate or inhibit nature attachment;
- Poor human attachment can reinforce nature attachment;
- Sympathetic adults can facilitate children's curiosity and experimentation, suggesting a 'mediated nature resilience' effect;
- Vicarious experience of nature cannot replace real experience;
- Having lower animal pets enhances environmental sympathy;
- Places with absent or degraded nature or which afford insufficient exploratory and 'nest building' opportunities may impede nature security;
- Large families may obstruct nature familiarity;
- Environmentalism may be multidimensional.

None of these findings in themselves preclude other sources of variation of environmental attitudes than the ones I have identified (for instance culture, economic or personal pressures, life experience as an adult). Unexamined influences include for example those of climate, ecosystem of upbringing, and the personality traits, history and culture of respondents.

To those who would suspect that the effects of topography or weather are peripheral to psychology's 'real' intra- and interpersonal concerns it is worth pointing that the diametrically opposite point has been made; namely that an indigenous-based 'ecopsychological model' of psychological well-being (specifically the Hoop (inter-relatedness in the horizontal dimension) and the Tree (capturing groundedness and aspiration in the vertical dimension)) proves that 'psychology *is* ecopsychology' (Hoffman 1998).

Qualitatively dissimilar, relations with the non-human are not inferior versions of the 'real thing', humans. They are non-substitutable, differentiated components of a greater picture of fully relating to the world at large. Whilst we await (though may never obtain) definitive 'proof' of the biophilia hypothesis' inbred 'love of nature', it is evident that the non-human can – and in a fully functional person does - hold unique emotional salience.

We *feel* nature because we cannot afford *not* to live in 'affective landscapes' – environments we traverse which offer threats and comforts, dangers and refuges to which we must respond, often as quickly as, quite literally, humanly possible. Bereft of our 'Hare Brains', or our 'Tortoise Minds' (Claxton 1997) we would not be able adequately to protect ourselves. Hence, our relationship with nature may not be primarily mediated through conceptualized and verbalized ideas and opinions about nature (although developmentally

and evolutionarily they come to matter), but through subconscious, hard-wired feelings and accompanying behaviours. These emotional landscapes may be the product of individual and collective interaction and experience, but they are not merely subjective, they are shared and real. Silently, subtly, and almost always beneath awareness, they profoundly govern our lives.

Over the life-span, it does not stretch a point too far to suggest that healthy relatedness to the non-human may rival in importance healthy human relations: it is certainly true that one cannot be replaced by a surfeit of the other without marked effects, some might say damage, occurring. Deprivation may precipitate its own particular psychopathology, as when having no choice but to work indoors:

> *'... my tendency to feel depressed may have less to do with any latent psychopathology or specific 'stressor' than it has to do with the impossibility of fulfilling my deeply intuited need to be part of a world that makes sense in a bodily, spiritual, and ecological way. Complementarily, the 'ability' to tolerate such inhuman conditions without becoming depressed may also be understood, when seen within a broader ecological context, as a sort of numbed acquiescence to a slow spiritual and ecological death.' (Kidner 2001, 69-70)*

On the other hand, a realistic yet sympathetic relationship with nature (the 'world'), embodying trust in its beneficence, and an appropriate wariness of its hazards, may well be a mark of mental health, acting as it does as a reliable friend, a bulwark against difficulties elsewhere in life. The parallels with healthy human relationships are striking. Both can only be attained through first hand experience.

If our continuing quality of life and perhaps survival depends on making a success of this relationship – and it is argued herein that we do not have a choice not to – then understanding its ontogeny is pivotal, guiding its unfolding in future generations critical, and therapeutically treating its damaging malformations in present populations highly desirable.

Chapter 10: Consequences, applications and further research

'Every child should have mud pies, grasshoppers, water bugs, tadpoles, frogs, mud turtles, elderberries, wild strawberries, acorns, chestnuts, trees to climb. Brooks to wade, water lilies, woodchucks, bats, bees, butterflies, various animals to pet, hayfields, pine-cones, rocks to roll, sand, snakes, huckleberries and hornets; and any child who has been deprived of these has been deprived of the best part of ... education'

Luther Burbank

The previous chapters confirm that the primary influence on children's relationship with nature is hands-on personal experience, which is irreplaceable, and which leads to adults who are assured and empathic in their dealings with the non-human. For that to happen, the child probably needs first to develop good relationships with parents, and then have both opportunity and permission to explore. Nature-confident adults can provide a healthy example just by doing what they already enjoy. Where these circumstances fail, children may still turn to nature but in perhaps less secure, more 'needy' ways.

As a result of these findings we are now able broadly to conceive of a generic, experiential pathway by which we arrive at our basic orientation to the non-human, which implicates nature itself, our earliest social engagements, and our own curiosity. Our place and situation of upbringing are demonstrably critical in forming our 'ecological self' (Naess 1989), which will inevitably be expressed through behaviours (see Chapter 3). Since they in turn help shape our environment, we have a feedback loop.

In the following pages a speculative model is offered for understanding how our culture might be seen to mitigate in multiple, mutually reinforcing ways against the successful formation of secure relationships with nature. A series of specific interventions is proposed, many underpinned or endorsed by these research findings (and not all directed at childhood[32]), but all with the potential to contribute to the reversal of what can seem like a

[32] The admittedly arguable assumption being made that what works for children may well also be positive for adults.

downward spiral. These include: supporting good 'nature parenting' and 'mentoring'; providing opportunities for positive, self-directed interaction with nature; taking into account individual differences in relations with nature, and; never forgetting the central issue – direct unsupervised contact.

Finally, it is hoped that the emerging theoretical directions presented here, particularly the proposal for a General Theory of Attachment encompassing all emotionally salient phenomena, will be taken forward by other researchers. As a contribution, a considerable number of suggestions for further research are assembled, mostly springing either directly or tangentially from this work.

10.1 Applications

10.1.1 An intergenerational downward spiral

In focusing on what happens when we vary the amount and quality of contact that children have with non-human nature in its various forms, we have revealed some of the likely consequences in later attitudes and perhaps in behaviour. Though we cannot be sure how these attitudes and behaviours described will play out in society at large, this author has no difficulty in believing that there will inevitably be significant outcomes. Now, therefore, comes the time to broaden consideration once again to the way in which consequences that we should not wish to happen may already be having their effects in society, what practical steps might be taken to address such problems, and what questions future researchers might consider asking in order to throw more light on what could be a life or death situation for our species.

Childhood experience may fundamentally pattern attitudes of adults to nature, and nature does not cease to act on the psyche merely because one is no longer a child. Many of the psychological correlates of the path of continued ecological loss that we have manifestly followed are ongoing, and many will worsen, including[33]:

[33] Incidentally, many of these also apply to the loss of internal complexity in human societies precipitated by amongst other things the market economy, but this is a wider debate that has deliberately been avoided in this thesis.

- Loss of physical complexity in our world and the beneficial challenge of surroundings, resulting in: fewer aesthetic pleasures, peak experiences, creative inspiration; a narrowing of the individual and collective knowledge base; loss of human cultural breadth, diversity and tolerance of 'the other';
- Reduction in complexity of interspecies relationships generally, including a reduction in variety of non-human 'others' to whom to humans can relate;
- Fewer opportunities for environmental 'nurturance', including a reduction in the capacity of the environment to 'soothe';
- Increasing difficulty in acquiring and maintaining secure supplies of resources, and competition in for them;
- Deteriorating Quality of Life, greater necessity for unsought mobility, more environmental challenges (e.g. weather) and disasters (e.g. floods, fires), and increasing isolation (e.g. ecologist Aldo Leopold's assertion that an ecologist lives 'alone in a world of wounds') and psychiatric symptoms (e.g. depression).

If, as is known, anti-environmental behaviour precipitates a decline in the quality of the natural environment and, as is suspected, a worse environment impacts negatively on mental health and attitudes to the environment, the probable cumulative effect over time may be a downward spiraling of both, each fuelling decline in the other.

This notion of an interlocked downward spiraling or negative feedback loop between environment and human psychology finds at least a partial illustrative mechanism in Kahn's proposed 'environmental generational amnesia' (EGA) (Kahn Jr. 2001, 183-4). Building on findings that while two thirds of children in a garbage-strewn and polluted neighbourhood of Houston, Texas understood the concept of pollution in general terms, yet only one third believed it affected them directly, Kahn suggests that each generation calibrates anew its expectations of the environment. Thus, 'if one's only experience is with a certain amount of pollution, then that amount becomes not pollution but the norm against which more polluted states are measured.'

Figure 10.1: Cycle of enviromental-psychological deterioration

Each generation takes as its norm (effectively the 'non-polluted condition') the environment encountered during childhood, and with each generation environmental quality deteriorates. The overall timescale of serious deterioration being greater than our lifetimes, we are unable to realise in a direct and experiential way the cumulative effect. This is why for most people the motivation to act is absent. If this EGA does indeed exist, 'it helps provide a psychological account of how our world has moved toward its environmentally precarious state.' Thus we are given a reason for actively maintaining parks and preserves in and near cities as a matter of need, and for taking children there (Kahn Jr. 2001, 6-7).

It is interesting to speculate how this psychological deterioration – presumably involving a more hostile internal working model of nature – may act: how it contributes to poorer subjective experience and what part it plays in increasing nature-hostile behaviour.

As a parallel model of a perhaps not unrelated process, it has been proposed that just as we have domesticated and brought under our control animals and nature at large, so too have we 'domesticated' ourselves (Wilson 1988). The suggestion that the once wild and free Homo sapiens exists now only in urban zoos, a sorrowful shadow of its former self may be a Romantic idea, but it appears to be more – to go beyond a mere physical analogy for civilisation and urbanisation. The proposal is that this process of domesticated imprisonment, conscious or not, is one that at its heart has the increasing internalisation of the machine metaphor for a human being. Whether we know it or not, we may have undertaken a Mephistophelian bargain for what appear to be the benefits of modernity, the downside of which is a degrading change in human consciousness and, indeed, in human nature itself.

To the extent that this is a correct diagnosis, and given the overall tone of this thesis, it is perpetuated through the professionalized apparatus of modern industrial society: the health service, architectural design and town planning, transport and economic policy. However much their practitioners deny or remain unaware of it, their incremental exclusion of nature and erroneous understandings of human developmental, educational, well-being and other needs in relation to the non-human almost certainly have long-term psycho-social sequelae.

In a culture firmly set on this downward spiral, it seems that the forces mitigating against the potentially positive effects of environmental education and education for sustainable development may be too strong – effectively ensuring they are running up a down escalator. It may be that they cannot succeed unless the childhood need for ordinary, everyday contact with and independent exploration in nature is met.

10.1.2 Reversing an anti-environmental culture?

Emboldened by our new understanding, can we not make a move to help turn the tide, changing the generations of anti-environmental culture by implementing a range of psychologically-insightful measures? Can we, for instance, embed much more prominently what might be termed 'ecopsychological intelligence' in all spheres of life, to create an 'environmentally aware society' analogous to the call for emotional intelligence that may lead to a psychologically aware society? (James 1998).

Can, for example, Attachment Theory form a basis for more psychologically-informed political policies that are likely to deliver environmental repair? Holmes (1996) notes that since the notion of 'security' is common currency to both political dialogue and psychotherapeutic discourse (which emphasises security as a central human need),

Attachment Theory can act as a point of entry for proposals of environment-related psychotherapy into the social debate. Social comment on psychological matters often seems, to the expert, inept, or too general to be of practical use. Whilst warning against the dangers of what he terms 'attention-seeking', in which the still largely marginal psychoprofessions stray out of their sphere to comment on social events, like protesting citizens throwing handfuls of gravel against advancing tanks, Holmes advocates cautious pronouncements from Attachment Theory and the concept of security in relation to social problems that link violence and inequality, the environment, and nationhood.

Some believe that the practice of psychologically informed therapy can directly prevent war and other products of destructive human motives. Specific aberrations of psychological health, argues Beck, underlie anger, interpersonal hostility, ethnic conflict and genocide. Perpetrators, who often believe they are doing good, are locked into distorted belief systems that control behaviour (the same in a rampaging mob as in an enraged spouse). Psychotherapeutic tools can be used by individuals and society to undercut the emotions driving such 'warped thinking' (Beck 1999). Some therapists claim that 'immersive moments' - instances of complete understanding between patient and therapist - are powerful enough to dislodge from its hiding place the alienated, detached self which our cultural emphasis on individualism and denigration of communalism engenders, and which is blamed for a rise in addictions and personality disorders, enabling the individual to begin incorporating the 'inner core' of motives into the 'external, social self' (Walant 1995). The echo of what have been identified as 'ecstatic moments' in nature is too obvious to ignore.

If this lofty project of renewal or healing contains even a grain of validity, then one might also wish to plan an arguably less acute, but perhaps even more desirable therapeutic action to support reduced environmental abuse. Certainly if one of the goals of environmentalism is the attainment of what has been called collective 'skillful living', then environmentally unsustainable behaviour can be perceived as crassly self-destructive behaviour of an addict. Indeed the language of addiction and recovery is already in use among radical, psychologically educated environmentalists (Glendinning, 1994).

Of course it is impractical to expect individualized, medium to long-term professional psychotherapy ever to occur en masse. Setting aside the question of whether all therapies are appropriate, there will be several orders of magnitude too few trained therapists available to administer it. If we optimistically assume 20 clients per therapist at any one time, it would require around 2 million new therapists in the UK and about 350 million globally! But if we intend to follow the therapy model, what practicable 'cultural ecotherapy' options are there?

Individual therapy for the worst 'offenders' (e.g. dog-batterers) could potentially be used, as it is in cases of marital violence. At present such a course might be politically weak, but it is not beyond comprehension that it could come to pass. This author would still more controversially like to see the possibility of compulsory treatment extended to those who abuse nature in other ways. Such an approach fails, however, to address the effects of societal reinforcements for environmentally abusive behaviour 'offensive' to nature. It may not stem the flow of new offenders. Nor does it address mass low-level behaviour. Some might argue that therapy for decision-makers – or some form of sanction that could have an analogous world-shaking impact - may be necessary, given the way that those who manage some business and political policies act in ways that carelessly assault the non-human. Such an approach might result in policy changes, or it might merely cause its subjects to retire from management positions. It might not necessarily have to take the form of overt therapy, but perhaps take the form of advice given by alert management consultants. One such consultant, John Elkington, reports that some powerful figures with whom he works in multinational boardrooms have already felt and expressed despair in emotional terms (Elkington 1995). However this recognition of the effects of careless actions by individuals does not address the structures that put these managers into such positions, nor the attitudes of those who put them there.

Reform of the global political and economic system so that it becomes the rule to place a higher value on nature than is currently the case is a goal of many environmentalists. Psychology is making a contribution through marketing of ideas and issues, generating peer pressure, training negotiating skills and methods of conflict resolution. It can have an impact: this kind of pressure from knowledge helped bring about nuclear disarmament of the superpowers.

Changes in education could play a part, but perhaps not in the usual form called for of curricular modification. Formal education seems not to be the primary shaper of environmental attitudes. Promising results have been demonstrated however, not necessarily directly by environmental education, but in projects that seek to explore and encourage empathy and compassion for both peers and animals among infant school children (Arkow and Ascione Undated; Fitzgerald 1980; Marvin, Cooper et al. 2002).

Holmes (1996) believes that clarification of ideas about the emotional effects of secure or insecure attachment followed by their wider promulgation would be good for general psychological health. Perhaps the same could apply to ecopsychological ideas. What must be acknowledged is that many ideas that 'experts' in psychopathology claim to have established already exist in elements of folk knowledge and behaviour, and that millions of folk-counsellors in society, be they family doctors, priests or grandmothers dispense a listening

ear and worldly advice (Illich 1978). These dispensers of wise counsel are perhaps the most efficient targets for bringing about change. Role models – e.g. pop and soap stars - are arguably too distant, idolized, transient and immature.

Of course, none of these interventions is likely in isolation to result in the reorientation of a culture that other drivers continue to impel in the opposite direction. Collectively, however, it is possible that sufficient interventions may have an impact.

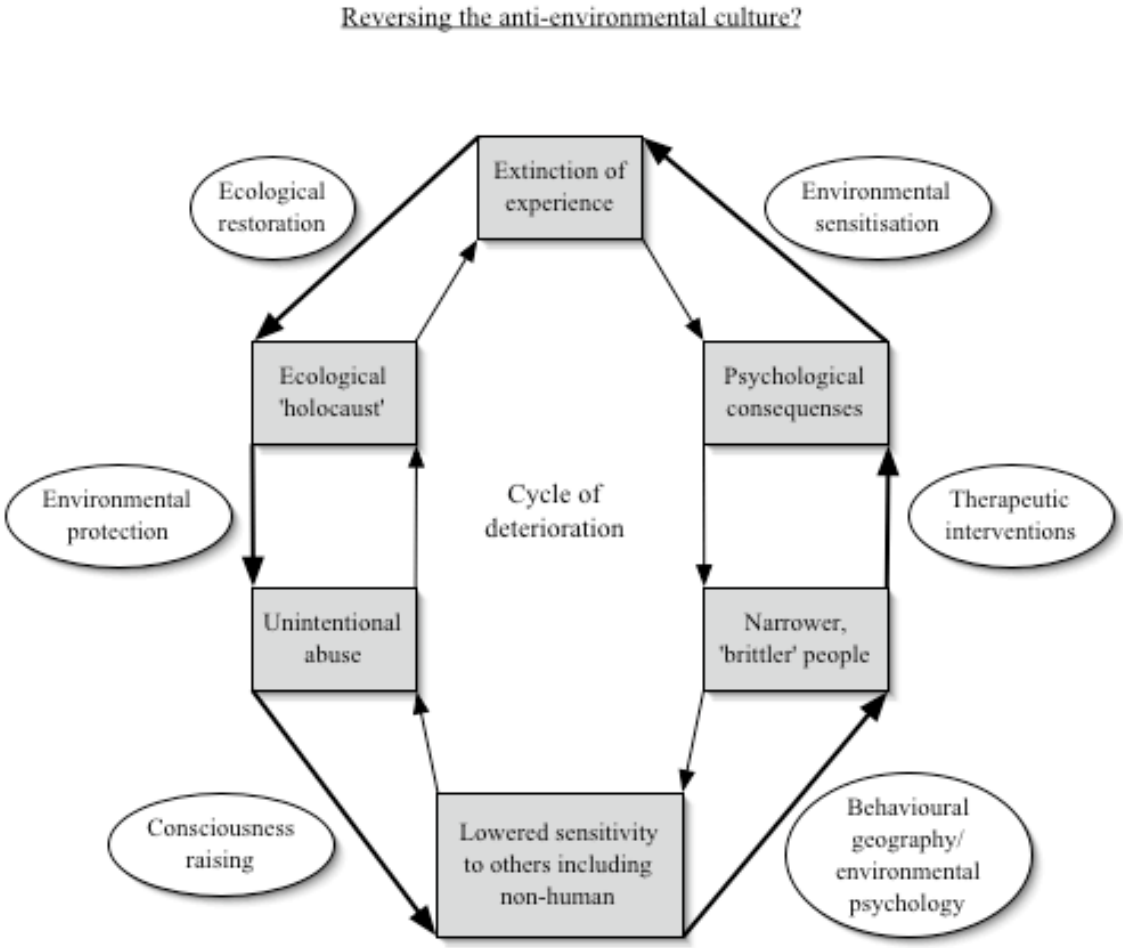


Figure 10.2: Proposed model for reversing anti-environmental culture

What is notably lacking from environmentalist discourse is an overarching conception of how its various manifestations, including those mentioned above, articulate. It is to address this omission that I proposed the following, largely self-explanatory, model (Hill 2001). Effectively, it is to look down the centre of the spiral diagram (Figure 10.1) and to place on it

existing downward drivers (the clockwise, inner arrows) and existing pro-environmental interventions (outer, anti-clockwise arrows) which might be seen as attempts to reverse each of the elements of deterioration (Figure 10.2).

Until half way through the twentieth century, all new ideas throughout human history have been communicated primarily interpersonally, and arguably this is still so for meaningful, personally affecting notions. All major socio-ideological changes – for example socialism, feminism and environmentalism - have taken several generations to become orthodoxy. The change we seek in attitudes to the environment has to be a slow, person-to-person revolution.

10.1.3 'Clinical' applications: possible positive interventions

An illustrative selection follows of more 'ecopsychologically-aware' policy prescriptions in a variety of areas (including education, planning, economics, conservation, democratic accountability and global geopolitics), which the lessons drawn from this and other similar research would support. Those that affect the young in particular have much in common with recent declarations on the 'rights of children' (Andersson-Brolin 2002). No claim is made that this is comprehensive, nor are items ordered by importance. For clarity a matrix of immediate and future actions, directed respectively at the non-human and at humans, has been considered.

10.1.3.1 Actions directed to benefit awareness of the non-human, in this generation

- Support and promote nurturant and security-enhancing human experience of nature – particularly by direct contact – including, for example, gardening, pet keeping, creation and enhancement of parks, and of city farms;
- Make the environment more acceptable to people, taking into account that in the countries causing greatest damage citizens are mainly urbanized and alienated from nature, and therefore they find it challenging to accept nature 'in the raw'. An example is the Forestry Commission's derided but correct attempt to increase 'visitor friendliness' by thinning out frequently visited areas (Blacker 2002);
- Encourage a sense of belonging and 'ownership' of objects of nature (such as urban trees, or community woodland) through, for example, public and especially

local participation in decision making about, and active maintenance of, local environments;

- Strengthen the local ability to regulate environmental exploitation, increasing overall public system sensitivity to signals of degradation.

10.1.3.2 Actions to change humans, in this generation

- Creation of real results from collective political action (e.g. the Kyoto protocol);
- Redrawing of world trade regulations to incorporate robust, ecologically-based, not economically-based, limitations on destructive human activity;
- Official recognition of the rights of other species and the interdependence of their welfare with human welfare (e.g. the Earth Charter);
- Encouraging greater collaboration among professionals in a range of disciplines, from public health to landscape architecture and city planning, to enhance environmental benefits (Frumkin 2001);
- Incorporating affective considerations into planning. As an example of a failure in this regard, it has been acknowledged that until recently the system used for planning recreation in US forests was 'incapable of incorporating emotional issues' (Mitchell, Force et al. 1993);
- Greening of poor neighbourhoods. It has been found that moving poor urban children to 'greener' areas enhances their cognitive functioning (Wells 2000));
- Applying ecotherapy in its many guises, which is already occurring in modest ways, but avoiding a one-size-fits-all approach. It has been shown that encouraging 'connectedness' to nature in at risk children brings about improvement in self-esteem and empathy, and diminished aggression (Feral 1998). As an example of how approaches may differ, those at ease with nature but ill at ease with crowds of humans may benefit most from group-centred therapy, such as experiential deep ecology, carried out in wild places; those afraid of nature but confident with, say, older women may benefit most from being led on wilderness journeys by a grandmother);
- Encouraging outdoor and adventure education, including sport but also psychologically premeditated courses such as wilderness experiences and vision quests, which could act as the ecotherapeutic equivalent of aversion therapy;

- Exposing the psychological underpinnings of behaviour toward nature. 'Conventional' and 'ecological' agricultural systems may have their roots not in 'science', but in two ways of expressing the self, and the same may also apply to differing institutional structures and processes affecting the use of nature (Hill 1991; Hill and MacRae 1995)).

10.1.3.3 Actions in favour of the non-human, over many generations

- Absolutely prevent the further fragmentation of ecosystems and preserve biodiversity hotspots;
- Preserve endangered animals and those whose gene pool threatens to become too narrow for survival as a temporary measure pending habitat restoration;
- Restore and expand non-human habitats;
- Reform planning at all levels to incorporate both human- and ecosystem-scale needs, and establish very long-term (e.g. 100 years) plans for the human population and limits to exploitation of nature, based on best estimates of its ability to absorb impacts (e.g. the currently politically fashionable contraction and convergence idea for CO2 emissions);
- Reconceptualise economics from overall growth to steady state with regard to living systems.

10.1.3.4 Actions to change human behaviour, over many generations

- Encourage cultural taboos on energy and natural resource wastage;
- Increase regional (implying 'bioregional' (Andruss 1990; Sale 1985)) co-operation on natural resource use and managing human impacts;
- Educate on the environmental and psychological effects of consumer society and encourage the questioning of its individual and collective purpose;
- Encourage the teaching of 'humane', emotionally sympathetic values;
- Value ecological restoration both as aesthetic amelioration and an experience of nurturance;

- Accept limits to, and responsibility for management of, inequity to levels that maintain tensions below the level that results in conflict and unacceptable suffering.

10.2 Further Research

A lengthy series of questions that have arisen at various times during this research project follows, arranged roughly according to domains of interest. Some relate primarily to attachment theory, some to questions of environmental attitudes and education. Still others are more concerned with questions of environmental and evolutionary psychology. Many have overlapping implications for the areas into which they are (arbitrarily) grouped, and for areas not explicitly mentioned. The author makes no claim to comprehensiveness in theoretical or awareness terms or, again, to an arrangement in order of importance. Some of these questions may already have been addressed in literature that the author has not examined, and the reader will undoubtedly be capable of posing questions that have not occurred to the author.

10.2.1 Questions that may have improved this research

As previously suggested, this survey omitted to gather data on certain parameters that might have proved useful. Lest it be understood that the following is advocating a lengthening of an already long questionnaire, it is worth noting that there is scope for significantly reducing complexity in other areas (e.g. removing redundant items from scales, using more tick box answers) to reduce the burden overall. With that proviso, future investigations should consider gathering data on:

- Marine and freshwater environments;
- Specific ‘favourite place’ location and surroundings; the nature of and motivation for exploratory behaviour; qualitative description of relationship with nature mentor(s), and; details of direct/indirect and vicarious nature experience;
- Personality dimensions, e.g. internal/external locus of control, creativity;

- Measures of non-environmental values, e.g. political ideology (known to affect support for environmental preservation (Steel, Steger et al. 1990) and perceptions of risk (Steel, Soden et al. 1990)) and optimism/pessimism.

More generally, for the purposes of intergenerational comparisons, any investigation using a similar method might benefit from building the investigation from the beginning symmetrically around a mirroring of childhood and adult experience, and perhaps even better add the *subjects' children's* experiences. Best of all, long term prospective following of cohorts throughout the life cycle - in the mode of attachment studies that have enabled the phenomenon of resilience to be demonstrated - would provide the most incontrovertible evidence.

A final suggestion for further research on this theme is that administering a simplified version of the questionnaire on the World Wide Web. While there are obvious difficulties of bias toward those who are on the internet, curious about this topic, or willing and able to fill in such a questionnaire, it may nevertheless be worthwhile since it would allow a single author to gather data from a larger sample and hence permit greater of statistical accuracy and more robust cross-cultural comparisons, albeit from respondents in the affluent world.

10.2.2 Theoretical questions

Future work on related theoretical questions might usefully examine the following:

- Can the findings of this survey be replicated with different target groups and cultures, with this methodology or another?;
- Given the suggestion herein that attachment to nature is a distinct category of human experience, there is a requirement for work to examine in greater detail how this comes about and how it relates to attachment to human objects, in particular whether attachments to natural objects differ in quality and intensity as they are known to between human and companion animal attachment figures;
- What are the characteristics of an 'internal working model of nature'?;
- What would an integrated attachment to nature or 'Nature Bonding Instrument' (taking into account people, animals, place and other factors) consist of?;
- Is an adult scale for attachment - an 'Adult Strange Situation' test - feasible?;

- Is there such a thing as ‘nature resilience’? Is ‘security’ multidimensional, including human and non-human relations, such that neither is substitutable?;
- Can childhood pets (or other non-human attachments) stand in for and have similar resilience-promoting effects, to non-parental human relationships?;
- Is there such a thing as ‘rejective environmentalism’? Do pet-owning children, who have experienced closer relationships to pets than family, have closer human relationships in adulthood?;
- How can we adequately describe animal attachment to humans, to each other, and to places, not just imprinting in simpler animals but the affective relations of pet dogs and cats, domesticated animals, wild animals humans encounter, e.g. via bird tables?;
- Is it meaningless to question whether lower animals, plants and places can develop ‘attachments’? How does the sentient/non-sentient, dead/alive distinction help us in the attachment to nature context? Is ‘experience’ something that only motile and sentient objects gain? Are these not inapplicable anthropocentric projections?;
- How low down the phylogenetic tree does attachment between animals go? How does it develop ontogenetically – in parallel with qualitatively more complex consciousness?;
- Is the reconstruction of the phylogenetic hierarchy in childhood based on ability to identify emotionally with the animals or something else, such as exposure, safety, the animal’s behavioural qualities?;
- To what extent is security engendered by familiarity with a particular place transferable to another place? If, as seems likely, it is only partly transferable, what part, and why?;
- Is sexual attraction enhanced by the demonstration of archetypally useful ‘male’ and ‘female’ knowledge (e.g. intimate knowledge of the home territory, ‘raiding’ skills), or attachment patterns to the non-human, over that of knowledgability in general?;
- Can theories of group (or peer) socialization be extended to incorporate the non-human?;
- Does further investigation support the proposed multi-dimensional environmentalism?;

- Is contact with non-human nature necessary for sanity? This could be investigated by, for instance, correlating land use with location-relevant mental health data;
- Why do parents fear fresh water yet take children to the seaside?

10.2.3 Developmental questions

Future work on related developmental questions might usefully examine the following:

- What are the developmental (e.g. physiological, neurological, linguistic, intellectual) effects of growing up in surroundings with particular non-human characteristics versus others, e.g. 'the concrete jungle' versus ecologically rich more natural habitat? Which physiological effects of being in natural surroundings as adults (e.g. of birdsong, or park land) are innate and which learned?;
- What particular characteristics of the environment (e.g. 'greenness', hiding opportunities, relative danger & safety, biodiversity) have specific effects upon the child's mind, and what are these effects?;
- Does the therapeutic introduction of pets or other nature-related additions to a child's familiar environment have any long-term effect?;
- Does landscape, ecology or climate predictably affect cultural attitudes to nature? What other factors shape cultural differences in behaviour toward nature?;
- Do the prevailing attitudes to nature in the culture a child experiences have developmental effects?;
- Are there neuroanatomical correlates of the non-human attachment patterns, as have been demonstrated for human attachment?;
- Why do those with more ecopolitically active parents choose to live more rurally?
- How exactly does parental nature mediation impact on career choice?;
- Is contact with nature (as with model human relationships) always healing? If so, is the healing in proportion to the time or intensity of contact?;

- Is there a threshold effect? How much nature contact and in what form (level of sentience, place- and species-familiarity, opportunity for interaction, opportunity for nurturance, specific characteristics of nature i.e. hostility/friendliness) is protective for personality characteristics, or for later attitudes to nature?
- What are the effects of partial and total (if that is possible) deprivation of nature?;
- What is the normative healthy upbringing (historically, cross-culturally) in terms of interactions with the various aspects of nature? Can modern industrial-urban lifestyles ever approximate to this?;
- Is the disturbance of place attachment and the network of human and non-human attachments an element in the psychological impact of involuntary migration (including demolition of housing, territorial conquest) and what are its longer-term consequences? Is the greater security of undisturbed inhabitants and the insecurity of immigrants a 'natural' defence against territorial takeover?

10.2.4 Questions on the nature of relationships

Future work on related relational questions might usefully examine the following:

- How does this nature attachment perspective articulate with the related but more purely psychoanalytically based object relations-attachment perspective? A combined instrument has been devised (Buelow, McClain et al. 1996);
- As abuse of pets and children are known to co-vary, are damaging behaviours with respect to the non-human in children and later in life more broadly related to poor interhuman relationships?;
- Does improving a child's (or an adult's) non-human environment enhance interpersonal behaviour and management of stress? If not within a lifetime, then over generations?;
- Do those who live alone and have little social life benefit most from acquiring a pet, as against those already living amid a complex of human relationships?
- Do parental attitudes to the non-human have effects on the formation of self?;
- What effect do sex and personality traits have on relations to nature?;

- Is adult ownership of a pet a symbol of the capacity for nurturance and therefore a sexual attractant? Is it the same for both men and women? Is being seen to 'love nature' indeed the same phenomenon?;
- Do pet owning children have a larger total number of close relationships with others, and are these relationships human and animal combined, or human alone? Is reliance on the human alone in any way harmful?;
- Are children with pets more tolerant of others, and of differences between persons?;
- What triggers the growing importance of relationships with pets in middle childhood, and how does this pattern lead into adolescent and adult relational patterns? Are there both normative and pathological relational sequences from birth to senescence?;
- What are the effects of long-term familiarity with landscape on the ability to detect change over time?

10.2.5 Educational questions

Future work on related educational questions might usefully examine the following:

- What is the absolute and comparative impact of short duration and/or intermittent environmental education experiences, including wilderness and vision quests, on environmental attitudes and behaviours?;
- Does the physical, emotional and personal context in which environmental education is delivered (e.g. classroom versus woods, obedient listening to a lecture versus more emotionally open or engaged group work, abstracted global issues versus concrete personally relevant) affect retention and later attitudinal and behavioural changes?;
- What is the long term effect of sustained, long term environmental education (i.e. a prospective study from infancy to adulthood)?;
- How do factors like education and social class affect environmental attitudes and behaviour – for example through the mediation of variables like teacher 'nature mentorship' (i.e. not curriculum but personal ease with nature) and parental ecopracticality?;

- Is the only truly effective ‘environmental education’ time spent in the company of non-human nature? What qualitative factors matter and why? How and for what reason is being alone for some of this time critical? What is the influence of parents? Can teachers have an influence if they are not ‘inspired’ and convey genuine enthusiasm themselves?;
- What are the comparative effects of direct preverbal experience of infant play with the non-human versus early childhood discovery, premeditated instruction at different stages, experience of nurturance (i.e. of classroom plants and animals), outdoor education (including technical or ‘conquering’ versus appreciative or ‘meditative’ orientations) and wilderness experiences?

10.2.6 Health and mental health questions

There are a number of areas which future work on related health and mental health questions might usefully include.

- Do generally well people who have regular contact with nature report greater well-being, sleep patterns, fewer headaches, reduced joint pain in chronic illness or any other markers of better physical health?;
- Do city children who attend a rural summer camp have better health during the subsequent school term or year than their friends who spent the summer in the city?;
- Do patients with serious debilitating disease (e.g. cancer, AIDS) survive longer, have fewer infections, less pain, or higher T-cell counts, if they have pets?;
- Does time spent in hospital gardens speed postoperative recovery?;
- Is there an empirical basis for psychotherapy that utilizes contact with nature?;
- If there are individual differences in attachment to nature, might the tailored application of a variety of ecotherapeutic approaches yield better results than ‘one-size fits all’? If any of these therapeutic approaches shows promise, which patients will benefit and what kinds of contact with nature have the greatest efficacy and cost effectiveness? (Frumkin 2001);

- Does the duration of contact with nature matter for outcomes in ways analogous to the different effects of brief versus long-term therapy?;
- Is being a 'nature abuser' stressful and a threat to health?;
- What do (psychoanalytically defined) 'projections' onto nature ('the garden is out of control'; 'an angry wind') signify for emotional health?;
- Does improving the environment or moving to a better one enhance health or mental health? Are these effects only over generations? Does 'ecological health' impact on this? As there is said to be ‘good enough’ parenting, is there 'good enough' place attachment?

10.3 A last word

This thesis has attempted to take the phrase ‘attachment to nature’ from a loosely employed figure of speech to a scientifically examined notion. In so doing it has provided some empirical justification for believing that, just as direct and early experience of human relationships crystalises into patterns of attachment that provide a semi-deterministic foundation to later human relations, so too do unmediated, personal experience of the non-human, and appropriate interpersonal encouragement embed enduring relational understandings of the natural world. Should subsequent research confirm this understanding, real and wide implications for the individual, for society and for nature itself follow.

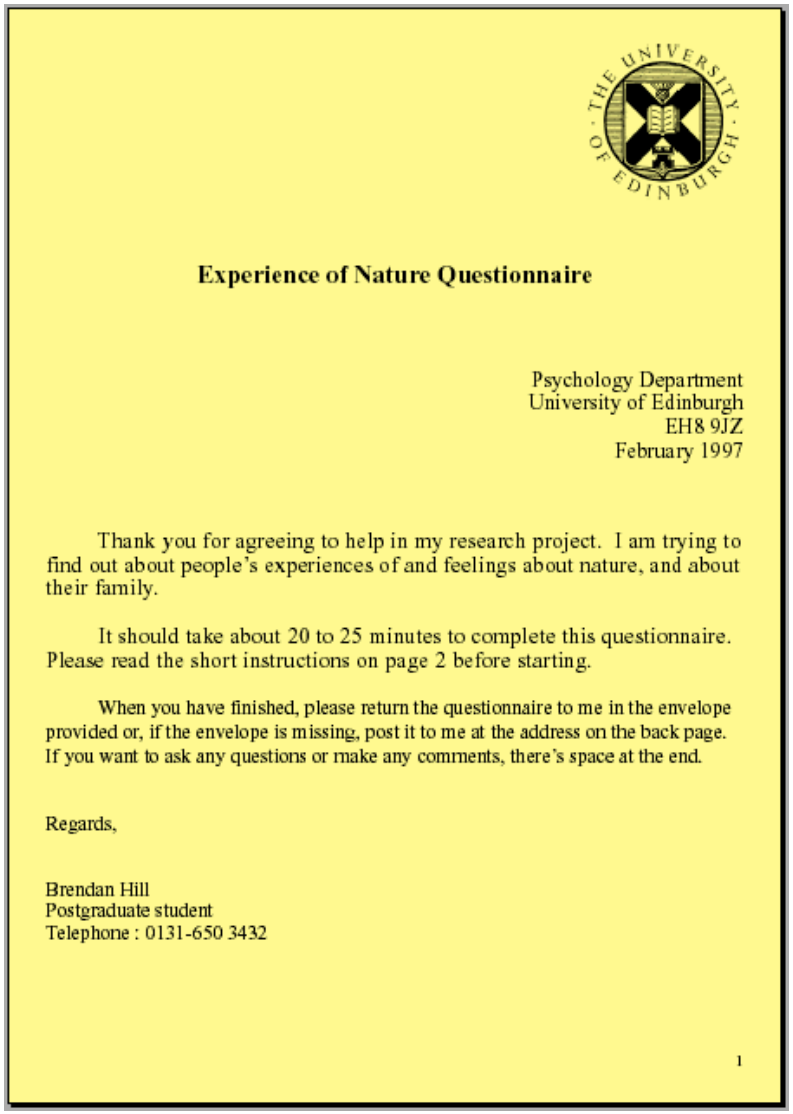
Attachment to nature is not an analogy.

Chapter 11: Appendices

11.1 Questionnaire as deployed

The version reproduced below is the first publicly employed version of February 1997.

In February 2000 a second public version was issued which corrected two minor typographical errors (page 20: ‘Tried to make me dependent on him’ under Section 6 mother changed to her, and ‘Felt I could not look after myself unless he was around’ changed to she).



Experience of Nature Questionnaire

Psychology Department
University of Edinburgh
EH8 9JZ
February 1997

Thank you for agreeing to help in my research project. I am trying to find out about people's experiences of and feelings about nature, and about their family.

It should take about 20 to 25 minutes to complete this questionnaire. Please read the short instructions on page 2 before starting.

When you have finished, please return the questionnaire to me in the envelope provided or, if the envelope is missing, post it to me at the address on the back page. If you want to ask any questions or make any comments, there's space at the end.

Regards,

Brendan Hill
Postgraduate student
Telephone : 0131-650 3432

1

Instructions

It will help me if you answer the following questions about you and your background as honestly as you can. There are lots of quick, easy questions. For most of them you just need to indicate the answer that describes you best by putting a neat circle around the right word or words, like so:

8.3. **How often do you fill in questionnaires?**

Never (Sometimes) Often

Some questions ask for a little more information.

If none of the alternatives exactly fits what you want to say, choose the answer that comes nearest. If you have a comment on any question, please feel free to add it in the margin - but try to give the closest answer for you anyway.

The questionnaire is anonymous - in other words you don't have to tell me your name, and if you do, I won't pass it on to anyone else. However, it's up to you if you don't want to answer certain of the questions; and remember - there are no right or wrong answers.

N.B.: Later in this questionnaire, I refer to your father and mother. If for any reason either or both of them were not there when you were growing up, please assume I mean the adult man or woman who cared for you most often as a child. If you did not have someone in that position, please go on to the next section.

SECTION 1: ABOUT YOU - *please circle the most correct option where there is a choice*

1.1. **Which of these best describes the place you live now?** *(please circle one)*

City Town Village The country but not a farm Farm

1.2. **If you live in a city, town or village, how many people live there (roughly) ?**

Less than 500 501-5,000 5,001-50,000 50,001-500,000 More than 500,000

1.3. **Were you:** *(please circle one)*

An only child The oldest child in your family The youngest A middle child

1.4. **How many brothers did you have?** .....

1.5. **How many sisters?** .....

1.6. **When did you leave school or education?** *(please circle one)*

Before O-levels/ Standard grade *(go to question 1.8.)*

After O-levels/ Standard grade *(go to question 1.8.)*

After A-levels/ Highers *(go to question 1.8.)*

After College or University (as an Undergraduate)

After College or University (as a Postgraduate)

1.7. **If you went to College or University, what subject did you study?**

.....

1.8. **What were your favourite subjects at school?**

.....

1.9. **What is your main occupation?** .....

1.10. **How old are you?** ..... years

1.11. **Are you:** Female or Male?

SECTION 2: WHAT YOU DID AS A CHILD

NOTE: *By childhood I mean your life up to 12 years old.*

2.1. **What country did you spend most of your childhood in?** .....

2.2. **How many different places did you live in up to the age of 12?** .....

2.3. **Which of these best describes the place you mostly lived as a child?**
(please circle one)

City Town Village The country but not a farm Farm

2.4. **How many people lived in your city, town or village (roughly)?**
(please circle one)

Less than 500 501-5,000 5,001-50,000 50,001-500,000 More than 500,000

2.5. **Was the place you lived most of the time a . . .?** *(please circle one)*

High-rise block

Terraced house (in a town or city)

House in the country

Detached or semi-detached house in a built up area

Detached or semi-detached house in an open estate

2.6. **Did the place where you mostly lived as a child have a garden?** Yes No

2.7. **Was there a park, countryside or woods nearby?** Yes No

2.8. **How often did you play close to home in parks, countryside or woods?**

Never Rarely Sometimes Often

2.9. **Do you remember having a favourite place to go as a child?** Yes No
(If not, go to question 2.12.)

2.10. **If so, can you briefly describe the place physically?**
(If no, please go to next question)

2.11. **What feelings do you remember having there?**

2.12. **How often did you wander further away (more than 20 minutes) to parks, woods or country, without your family?**

Never Rarely Sometimes Often

2.13. **How did it feel when you did this?**

Hated it Disliked it Liked it Loved it

2.14. **If you grew up in a town or city, how often were you taken on trips to the country?** *(If you grew up in the country, please go to question 2.16.)*

Never Rarely Sometimes Often

2.15. **How did it feel when you made these trips?**

Hated it Disliked it Liked it Loved it

(If you grew up in a town or city, please go to question 2.18.)

2.16. **If you grew up in the country, how often were you taken to towns or cities?**

Never Rarely Sometimes Often

2.17. **How did it feel when you made these trips?**

Hated it Disliked it Liked it Loved it

2.18. **Did your family have pets?** Yes No
(If no, please go to question 2.20.)

2.19. **Please circle which pets you had.**

Dog(s) Cat(s) Horse/ Pony Other mammal (e.g. gerbil, mouse)

Bird(s) Fish Snake/ Reptile Insect Other (specify)

2.20. **As a child, did you have any hobbies where you had direct contact with nature, e.g. gardening, fishing, birdwatching, collecting flowers or insects?**
(If not, please go to question 2.23.)

Yes No

2.21. **How often did you do these hobbies?**

Never Rarely Sometimes Often

2.22. **Which was your favourite?**

.....

2.23. **When you were a child, did you read books or magazines about nature?**

Never Rarely Sometimes Often

2.24. **Did you have a television in your house?** Yes No

2.25. **How often did you watch TV or listen to radio programmes about nature?**
(If never, go to question 2.27.)

Never Rarely Sometimes Often

2.26. **If you did read or watch or listen to programmes about nature, <u>why</u> did you do these things?**

.....

.....

2.27. **Was there any adult from whom you remember learning about nature?**
(If no, please go to section 3.)

Yes No

2.28. **Were they a . . .?** *(circle all the ones you remember)*

Parent Relative Teacher Family friend Other (please specify)

2.29. **How do you remember feeling about this person or people?**

.....

.....

SECTION 3: ABOUT YOUR PARENTS

3.1. **What was your father's main occupation (during your childhood)?**

.....

3.2. **What your your mother's main occupation (during your childhood)?**

.....

3.3. **During your childhood, did your mother mostly . . .?**

Stay at home Work part-time away from home Work full-time away from home

3.4. **When you were a child, did your parents belong to any groups working to protect the environment (locally or otherwise)?**

Yes No

3.5. **Which groups do you remember them belonging to?**

.....

.....

3.6.-3.15. For the list of activities below, circle on the opposite page how often you remember your parents doing them when you were a child (even if it wasn't for environmental reasons).

I remember my parents:

Recycling things (for example, bottles, glass, newspapers or cans)	.....	*Never*	*Rarely*	*Sometimes*	*Often*
Saving energy (e.g. by keeping the heating low and wearing warmer clothes indoors)	.....	*Never*	*Rarely*	*Sometimes*	*Often*
Choosing products with minimal packaging	.....	*Never*	*Rarely*	*Sometimes*	*Often*
Composting things like vegetable scraps and garden cuttings	.....	*Never*	*Rarely*	*Sometimes*	*Often*
Trying to save water (for example, by having a shower instead of a bath)	.....	*Never*	*Rarely*	*Sometimes*	*Often*
Choosing environmentally friendly or 'green' products	.....	*Never*	*Rarely*	*Sometimes*	*Often*
Walking, cycling or using public transport instead of a car to travel around	.....	*Never*	*Rarely*	*Sometimes*	*Often*
Donating time or money to environmental or conservation organisations	.....	*Never*	*Rarely*	*Sometimes*	*Often*
Going to protests or demonstrations about the environment	.....	*Never*	*Rarely*	*Sometimes*	*Often*
Writing or speaking to councillors, politicians or companies about environmental issues	.....	*Never*	*Rarely*	*Sometimes*	*Often*

SECTION 4: GIVING

4.1.-4.8. Imagine you had £100, but you had to give it all away to the (imaginary) charities in the list below (it doesn't matter if you don't give to charities in real life). Please write in the spaces on the opposite page the number of pounds you would give to each. You can give it all all to one charity, or spread it across as many as you like.

It helps to read about all the charities before deciding.

This charity works to protect important wildlife habitats, especially those of rare plants and birds . . . . . .

This charity raises money for cancer research and prevention . . . . . .

This charity tries to improve the way farm and laboratory animals are looked after by campaigning against cruel and unneccessary practices . . . .

This charity campaigns against the imprisonment, torture and murder of innocent people living under oppressive political regimes throughout the world . . .

This charity rescues abused, neglected or ill-treated animals and finds them better homes . . . . . .

This charity helps people who are suffering from chronic or terminal illness through nursing care, and specially equipped centres . . . . .

This charity aims to conserve rainforests and other vital habitats worldwide by campaigning against environmental destruction and pollution . . . . . .

This charity sends food, clothing, medicines and development aid to people all over the world who are suffering from famines, natural disasters or war . . . . . .

How much of my £100:

. . . . . *I would gtve tlts charity £* . . . . .

. . . . . *I would gtve tlts charity £* . . . . .

. . . . . *I would gtve tlts charity £* . . . . .

. . . . . *I would gtve tlts charity £* . . . . .

. . . . . *I would gtve tlts charity £* . . . . .

. . . . . *I would gtve tlts charity £* . . . . .

. . . . . *I would gtve tlts charity £* . . . . .

. . . . . *I would gtve tlts charity £* . . . . .

N.B. Total **must** equal £100

SECTION 5: ABOUT YOU NOW

5.1.-5.16. How often, if at all, do you do each of the following?
(please circle as appropriate)

Spend time outdoors in parks, woods or the country because of my job	*Never*	*Hardly ever*	*Every year*	*Every month*	*Every week*	*Every day*
Walk or exercise close to home in a park, woods or country <u>with other people</u> . . .	*Never*	*Hardly ever*	*Every year*	*Every month*	*Every week*	*Every day*
Walk a pet close to home in a park, woods or country <u>without other people</u>	*Never*	*Hardly ever*	*Every year*	*Every month*	*Every week*	*Every day*
Walk or exercise close to home in a park, woods or countryside <u>on my own</u>	*Never*	*Hardly ever*	*Every year*	*Every month*	*Every week*	*Every day*
Travel further afield for a walk or exercise, without staying overnight	*Never*	*Hardly ever*	*Every year*	*Every month*	*Every week*	*Every day*
Go camping or caravanning	*Never*	*Hardly ever*	*Every year*	*Every month*	*Every week*	*Every day*
Visit wilder areas like National Parks, moors or mountains	*Never*	*Hardly ever*	*Every year*	*Every month*	*Every week*	*Every day*
Do gardening or grow plants or food	*Never*	*Hardly ever*	*Every year*	*Every month*	*Every week*	*Every day*
Go fishing	*Never*	*Hardly ever*	*Every year*	*Every month*	*Every week*	*Every day*
Do field sports like shooting or hunting	*Never*	*Hardly ever*	*Every year*	*Every month*	*Every week*	*Every day*
Go bird or animal watching	*Never*	*Hardly ever*	*Every year*	*Every month*	*Every week*	*Every day*
Go out to study plants, trees or other growing things	*Never*	*Hardly ever*	*Every year*	*Every month*	*Every week*	*Every day*
Do non-motorised outdoor sport, e.g. mountaineering, orienteering, sailing or diving	*Never*	*Hardly ever*	*Every year*	*Every month*	*Every week*	*Every day*
Do motorised outdoor sport, e.g. motocross, rallying, water skiing	*Never*	*Hardly ever*	*Every year*	*Every month*	*Every week*	*Every day*
Watch or listen to nature programmes on the television or radio	*Never*	*Hardly ever*	*Every year*	*Every month*	*Every week*	*Every day*
Read magazines or other written information about nature	*Never*	*Hardly ever*	*Every year*	*Every month*	*Every week*	*Every day*

5.17.-5.26. For the list of activities below, please circle on the opposite page the things you do now, and how often (for whatever reason).

I recycle things (for example, bottles, glass, newspapers or cans)	*Never*	*Rarely*	*Sometimes*	*Often*
I save energy (e.g. by keeping the heating low and wearing warmer clothes indoors)	*Never*	*Rarely*	*Sometimes*	*Often*
I choose products with minimal packaging	*Never*	*Rarely*	*Sometimes*	*Often*
I compost things like vegetable scraps and garden cuttings	*Never*	*Rarely*	*Sometimes*	*Often*
I try to save water (for example, by having a shower instead of a bath)	*Never*	*Rarely*	*Sometimes*	*Often*
I choose environmentally friendly or 'green' products	*Never*	*Rarely*	*Sometimes*	*Often*
I walk, cycle or use public transport instead of a car to travel around	*Never*	*Rarely*	*Sometimes*	*Often*
I donate time or money to environmental or conservation organisations	*Never*	*Rarely*	*Sometimes*	*Often*
I have been on protests or demonstrations about the environment	*Never*	*Rarely*	*Sometimes*	*Often*
I have written or spoken to councillors, politicians or companies about environmental issues	*Never*	*Rarely*	*Sometimes*	*Often*

5.27. **Do you belong to any nature or conservation groups now?** *Yes* *No*
(If no, please go to top of next page)

5.28. **If so, which do you belong to?** .....

.....

SECTION 6: YOU AND YOUR PARENTS

This part of the questionnaire asks how your parents behaved toward you when you were younger.

6.1.-6.25. Here are some questions about your FATHER, or the adult man who cared for you most as a child.
(If you did not have someone in this position, please go to the next section.)

As you remember your FATHER in your first 12 years, please circle the most appropriate answer next to each question. My father:

Spoke to me with a warm and friendly voice	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*
Did not help me as much as I needed	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*
Let me do those things I liked doing	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*
Seemed emotionally cold to me	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*
Appeared to understand my problems and worries	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*
Was affectionate to me	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*
Liked me to make my own decisions	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*
Did not want me to grow up	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*
Tried to control everything I did	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*
Invaded my privacy	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*
Enjoyed talking things over with me	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*
Frequently smiled at me	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*
Tended to baby me	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*
Did not seem to understand what I needed or wanted	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*
Let me decide things for myself	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*

Made me feel I wasn't wanted	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*
Could make me feel better when I was upset	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*
Did not talk with me very much	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*
Tried to make me dependent on him	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*
Felt I could not look after myself unless he was around	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*
Gave me as much freedom as I wanted	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*
Let me go out as often as I wanted	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*
Was overprotective of me	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*
Did not praise me	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*
Let me dress in any way I pleased	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*

6.26.-6.50. Here are some questions about your MOTHER, or the adult woman who cared for you most as a child.
(If you did not have someone in this position, please go to the next section.)

As you remember your MOTHER in your first 12 years, please circle the most appropriate answer next to each question. My mother:

Spoke to me with a warm and friendly voice	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*
Did not help me as much as I needed	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*
Let me do those things I liked doing	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*
Seemed emotionally cold to me	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*
Appeared to understand my problems and worries	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*
Was affectionate to me	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*

Liked me to make my own decisions	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*
Did not want me to grow up	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*
Tried to control everything I did	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*
Invaded my privacy	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*
Enjoyed talking things over with me	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*
Frequently smiled at me	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*
Tended to baby me	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*
Did not seem to understand what I needed or wanted	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*
Let me decide things for myself	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*
Made me feel I wasn't wanted	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*
Could make me feel better when I was upset	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*
Did not talk with me very much	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*
Tried to make me dependent on him	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*
Felt I could not look after myself unless he was around	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*
Gave me as much freedom as I wanted	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*
Let me go out as often as I wanted	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*
Was overprotective of me	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*
Did not praise me	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*
Let me dress in any way I pleased	*Very unlike this*	*A bit unlike this*	*A bit like this*	*Very like this*

SECTION 7: ABOUT NATURE

7.1.-7.12. **Below there is a list of statements about the environment.**

Please read each one carefully, then indicate how much you agree or disagree with it by circling the most appropriate words on the opposite page.

There are things about nature, like rarity, species diversity and beauty, which cannot be measured in money	*Strongly dtsagree*	*Dtsagree*	*Agree*	*Strongly agree*
When the interests of people and nature conflict, people should come first	*Strongly dtsagree*	*Dtsagree*	*Agree*	*Strongly agree*
Public opinion on environmental issues is often uninformed and emotive, so it's better to rely on the advice of scientists and economists	*Strongly dtsagree*	*Dtsagree*	*Agree*	*Strongly agree*
Science and technology can safely modify natural systems to do what we want and prevent undesired consequences	*Strongly dtsagree*	*Dtsagree*	*Agree*	*Strongly agree*
If the richness and diversity of the natural world are to be maintained, there must be a decrease in the human population	*Strongly dtsagree*	*Dtsagree*	*Agree*	*Strongly agree*
Things like environmental protection are worth what people will pay for them	*Strongly dtsagree*	*Dtsagree*	*Agree*	*Strongly agree*
If humans were to be wiped off the face of the earth, there would not be purpose or meaning in the continuance of other life on the planet	*Strongly dtsagree*	*Dtsagree*	*Agree*	*Strongly agree*
Humans are as much a part of nature as trees, animals, rivers and hurricanes	*Strongly dtsagree*	*Dtsagree*	*Agree*	*Strongly agree*
Nature operates as a whole, so we can't properly understand it just by looking at individual parts	*Strongly dtsagree*	*Dtsagree*	*Agree*	*Strongly agree*
Wilderness areas have a right to exist, and should be preserved regardless of their value to humanity	*Strongly dtsagree*	*Dtsagree*	*Agree*	*Strongly agree*
We don't have to protect endangered species, especially dangerous animals, when they threaten human interests	*Strongly dtsagree*	*Dtsagree*	*Agree*	*Strongly agree*
The main purpose for nature and natural products is to satisfy our needs and desires	*Strongly dtsagree*	*Dtsagree*	*Agree*	*Strongly agree*

7.13.-7.24. Below are some statements from people, saying how they feel about nature.

Please read each one and then indicate how much you agree or disagree by circling the statement closest to your response.

It's wonderful that humans have managed to control and civilize virtually the whole planet	*Strongly dtsagree*	*Dtsagree*	*Agree*	*Strongly agree*
I don't mind a few wasps, ants or bees around when I'm having a picnic	*Strongly dtsagree*	*Dtsagree*	*Agree*	*Strongly agree*
When I am outdoors and away from people, it brings up memories for me	*Strongly dtsagree*	*Dtsagree*	*Agree*	*Strongly agree*
I prefer being indoors than outside in parks, gardens or the countryside	*Strongly dtsagree*	*Dtsagree*	*Agree*	*Strongly agree*
It disturbs me that there are so few places left that are unaffected by humans . . .	*Strongly dtsagree*	*Dtsagree*	*Agree*	*Strongly agree*
Being out in nature makes me feel less happy in myself	*Strongly dtsagree*	*Dtsagree*	*Agree*	*Strongly agree*
Wild, unknown areas are exciting to me	*Strongly dtsagree*	*Dtsagree*	*Agree*	*Strongly agree*
People who chain themselves to trees to stop them being chopped down are a bit silly	*Strongly dtsagree*	*Dtsagree*	*Agree*	*Strongly agree*
I feel spiritually uplifted when I'm surrounded by nature	*Strongly dtsagree*	*Dtsagree*	*Agree*	*Strongly agree*
I feel more anxious when I'm out in the countryside than when I'm in a town . . .	*Strongly dtsagree*	*Dtsagree*	*Agree*	*Strongly agree*
Being close to nature is a feeling I enjoy	*Strongly dtsagree*	*Dtsagree*	*Agree*	*Strongly agree*
I hate going to the woods or countryside because there's nothing to do there	*Strongly dtsagree*	*Dtsagree*	*Agree*	*Strongly agree*

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Thank you!

Thank you for completing my questionnaire. I hope you enjoyed it. You have probably gathered by now that I am looking at whether the place people grow up and their family background influence their attitude to nature.

I will be doing some interviews soon in connection with my research, and I need some volunteers to be interviewed. If you would be willing to speak with me at greater length, please tick here ☐ (and remember to give me your address and/or telephone number at the end).

When I have looked at the answers and interviews from a large number of people, I will be writing a report. I'm interested in any comments or suggestions you might have about this questionnaire or about my research in general, so please tell me (or ask any questions you have) opposite.

If you would like me to send you a summary of the research when it is complete, please write your name and address below. Your name will not be passed on to anyone else or used in anything I write, although I may keep it on computer for my own use (to post the summary to you).

.....

.....

..... Telephone .....

Once more, many thanks for your help.

Brendan Hill

NOW PLEASE PUT THIS QUESTIONNAIRE INTO THE ENVELOPE PROVIDED AND RETURN IT TO ME.
(If for some reason the envelope is missing, I'd be very grateful if you could post it to the address on the back page.)

Brendan Hill
Department of Psychology
University of Edinburgh
7 George Square
Edinburgh EH8 9JZ

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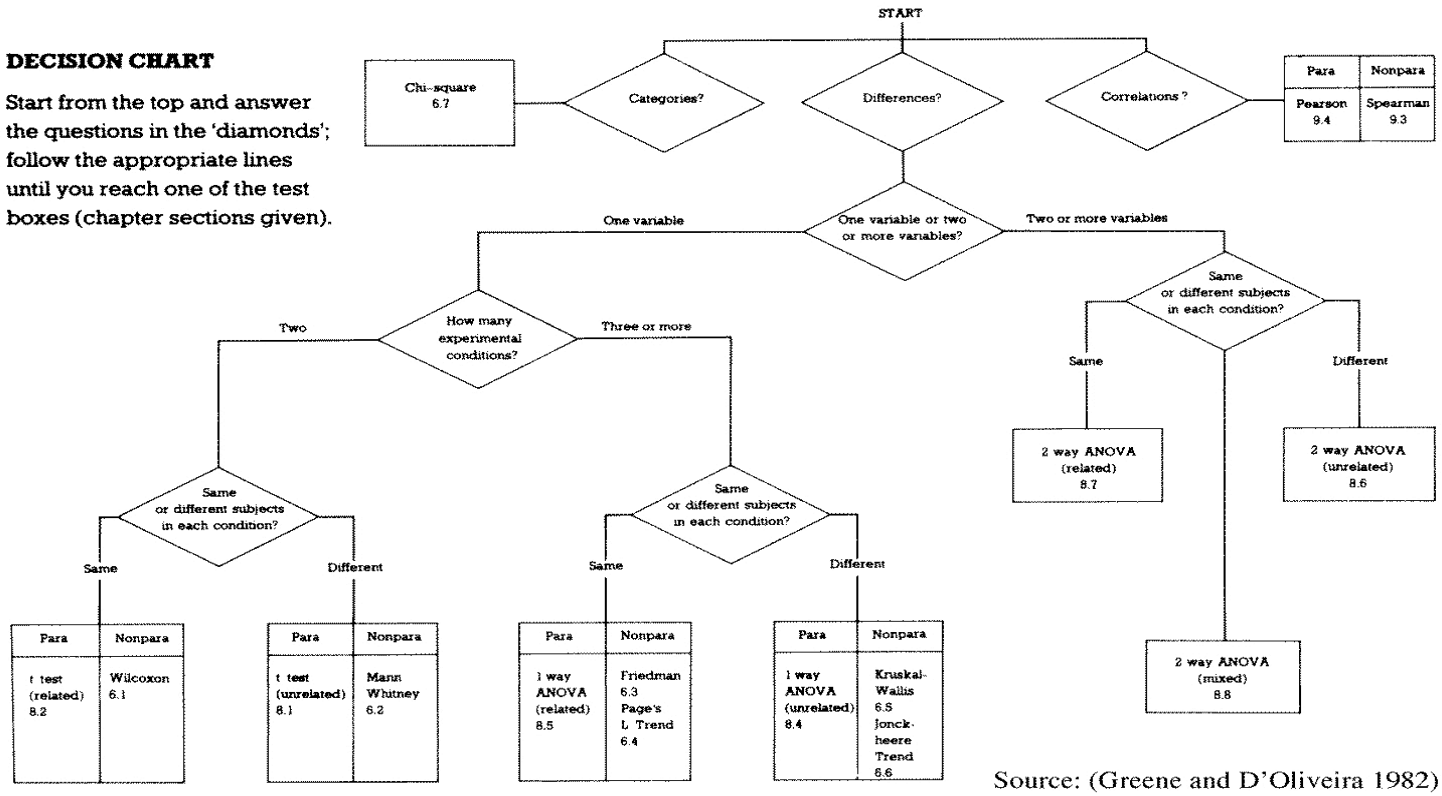
11.2 Statistical test decision flow chart



Source: (Greene and D'Oliveira 1982)

11.3 Sum of squares tables

11.3.1 Sum of squares *tables relating to Chapter 6.1*

11.3.1.1 Paternal attachment versus ecoevaluation

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreTechnocentric	5.181	3	1.727	1.742	.159
	FactorScoreAnthropocentric	2.513	3	.838	.842	.472
	FactorScoreConservationist	1.584	3	.528	.515	.673
	FactorScoreEcocentric	11.811	3	3.937	4.042	.008
Intercept	FactorScoreTechnocentric	3.004	1	3.004	3.030	.083
	FactorScoreAnthropocentric	.693	1	.693	.696	.405
	FactorScoreConservationist	.713	1	.713	.695	.405
	FactorScoreEcocentric	1.969	1	1.969	2.021	.157
FATTCHMT	FactorScoreTechnocentric	5.181	3	1.727	1.742	.159
	FactorScoreAnthropocentric	2.513	3	.838	.842	.472
	FactorScoreConservationist	1.584	3	.528	.515	.673
	FactorScoreEcocentric	11.811	3	3.937	4.042	.008
Error	FactorScoreTechnocentric	219.078	221	.991		
	FactorScoreAnthropocentric	219.910	221	.995		
	FactorScoreConservationist	226.762	221	1.026		
	FactorScoreEcocentric	215.258	221	.974		
Total	FactorScoreTechnocentric	224.262	225			
	FactorScoreAnthropocentric	222.425	225			
	FactorScoreConservationist	228.346	225			
	FactorScoreEcocentric	227.071	225			
Corrected Total	FactorScoreTechnocentric	224.259	224			
	FactorScoreAnthropocentric	222.423	224			
	FactorScoreConservationist	228.346	224			
	FactorScoreEcocentric	227.069	224			

a R Squared = .023 (Adjusted R Squared = .010)
b R Squared = .011 (Adjusted R Squared = -.002)
c R Squared = .007 (Adjusted R Squared = -.007)
d R Squared = .052 (Adjusted R Squared = .039)

11.3.1.2 Maternal attachment versus ecoevaluation

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreTechnocentric	3.469	3	1.156	1.152	.329

	FactorScoreAnthropocentric	2.882	3	.961	.962	.411
	FactorScoreConservationist	4.693	3	1.564	1.566	.199
	FactorScoreEcocentric	6.903	3	2.301	2.345	.074
Intercept	FactorScoreTechnocentric	1.613	1	1.613	1.607	.206
	FactorScoreAnthropocentric	2.449E-03	1	2.449E-03	.002	.961
	FactorScoreConservationist	7.300E-02	1	7.300E-02	.073	.787
	FactorScoreEcocentric	2.124	1	2.124	2.165	.143
MATTCHMT	FactorScoreTechnocentric	3.469	3	1.156	1.152	.329
	FactorScoreAnthropocentric	2.882	3	.961	.962	.411
	FactorScoreConservationist	4.693	3	1.564	1.566	.199
	FactorScoreEcocentric	6.903	3	2.301	2.345	.074
Error	FactorScoreTechnocentric	226.831	226	1.004		
	FactorScoreAnthropocentric	225.623	226	.998		
	FactorScoreConservationist	225.802	226	.999		
	FactorScoreEcocentric	221.741	226	.981		
Total	FactorScoreTechnocentric	230.299	230			
	FactorScoreAnthropocentric	228.523	230			
	FactorScoreConservationist	230.497	230			
	FactorScoreEcocentric	228.648	230			
Corrected Total	FactorScoreTechnocentric	230.299	229			
	FactorScoreAnthropocentric	228.505	229			
	FactorScoreConservationist	230.495	229			
	FactorScoreEcocentric	228.643	229			

a R Squared = .015 (Adjusted R Squared = .002)
b R Squared = .013 (Adjusted R Squared = .000)
c R Squared = .020 (Adjusted R Squared = .007)
d R Squared = .030 (Adjusted R Squared = .017)

11.3.1.3 Paternal attachment versus ecoemotionality

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreNatureSecure	7.761	3	2.587	2.641	.050
	FactorScoreNatureFearful	2.806	3	.935	.922	.431
	FactorScoreNatureDismissive	1.740	3	.580	.579	.629
	FactorScoreNatureStoic	4.434	3	1.478	1.492	.217
Intercept	FactorScoreNatureSecure	2.346	1	2.346	2.396	.123
	FactorScoreNatureFearful	1.573	1	1.573	1.551	.214
	FactorScoreNatureDismissive	.431	1	.431	.430	.512
	FactorScoreNatureStoic	2.243	1	2.243	2.263	.134
FATTCHMT	FactorScoreNatureSecure	7.761	3	2.587	2.641	.050
	FactorScoreNatureFearful	2.806	3	.935	.922	.431
	FactorScoreNatureDismissive	1.740	3	.580	.579	.629
	FactorScoreNatureStoic	4.434	3	1.478	1.492	.217
Error	FactorScoreNatureSecure	241.926	247	.979		
	FactorScoreNatureFearful	250.606	247	1.015		
	FactorScoreNatureDismissive	247.302	247	1.001		

	FactorScoreNatureStoic	244.763	247	.991
Total	FactorScoreNatureSecure	249.913	251	
	FactorScoreNatureFearful	253.417	251	
	FactorScoreNatureDismissive	249.047	251	
	FactorScoreNatureStoic	249.208	251	
Corrected Total	FactorScoreNatureSecure	249.687	250	
	FactorScoreNatureFearful	253.412	250	
	FactorScoreNatureDismissive	249.042	250	
	FactorScoreNatureStoic	249.197	250	

a R Squared = .031 (Adjusted R Squared = .019)
b R Squared = .011 (Adjusted R Squared = -.001)
c R Squared = .007 (Adjusted R Squared = -.005)
d R Squared = .018 (Adjusted R Squared = .006)

11.3.1.4 Maternal attachment versus ecoemotionality

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreNatureSecure	7.761	3	2.587	2.641	.050
	FactorScoreNatureFearful	2.806	3	.935	.922	.431
	FactorScoreNatureDismissive	1.740	3	.580	.579	.629
	FactorScoreNatureStoic	4.434	3	1.478	1.492	.217
Intercept	FactorScoreNatureSecure	2.346	1	2.346	2.396	.123
	FactorScoreNatureFearful	1.573	1	1.573	1.551	.214
	FactorScoreNatureDismissive	.431	1	.431	.430	.512
	FactorScoreNatureStoic	2.243	1	2.243	2.263	.134
FATTCHMT	FactorScoreNatureSecure	7.761	3	2.587	2.641	.050
	FactorScoreNatureFearful	2.806	3	.935	.922	.431
	FactorScoreNatureDismissive	1.740	3	.580	.579	.629
	FactorScoreNatureStoic	4.434	3	1.478	1.492	.217
Error	FactorScoreNatureSecure	241.926	247	.979		
	FactorScoreNatureFearful	250.606	247	1.015		
	FactorScoreNatureDismissive	247.302	247	1.001		
	FactorScoreNatureStoic	244.763	247	.991		
Total	FactorScoreNatureSecure	249.913	251			
	FactorScoreNatureFearful	253.417	251			
	FactorScoreNatureDismissive	249.047	251			
	FactorScoreNatureStoic	249.208	251			
Corrected Total	FactorScoreNatureSecure	249.687	250			
	FactorScoreNatureFearful	253.412	250			
	FactorScoreNatureDismissive	249.042	250			
	FactorScoreNatureStoic	249.197	250			

a R Squared = .031 (Adjusted R Squared = .019)
b R Squared = .011 (Adjusted R Squared = -.001)
c R Squared = .007 (Adjusted R Squared = -.005)
d R Squared = .018 (Adjusted R Squared = .006)

11.3.1.5 Paternal attachment versus relative sympathies

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreEnvirontSympathy	6.124	3	2.041	2.076	.104
	FactorScoreAnimalSympathy	1.932	3	.644	.632	.595
		4.024	3	1.341	1.409	.240
Intercept	FactorScoreEnvirontSympathy	.179	1	.179	.182	.670
	FactorScoreAnimalSympathy	.420	1	.420	.413	.521
	FactorScoreHumanSympathy	.431	1	.431	.453	.502
FATTCHMT	FactorScoreEnvirontSympathy	6.124	3	2.041	2.076	.104
	FactorScoreAnimalSympathy	1.932	3	.644	.632	.595
	FactorScoreHumanSympathy	4.024	3	1.341	1.409	.240
Error	FactorScoreEnvirontSympathy	265.459	270	.983		
	FactorScoreAnimalSympathy	275.079	270	1.019		
	FactorScoreHumanSympathy	257.008	270	.952		
Total	FactorScoreEnvirontSympathy	271.584	274			
	FactorScoreAnimalSympathy	277.052	274			
	FactorScoreHumanSympathy	261.327	274			
Corrected Total	FactorScoreEnvirontSympathy	271.583	273			
	FactorScoreAnimalSympathy	277.010	273			
	FactorScoreHumanSympathy	261.032	273			

a R Squared = .023 (Adjusted R Squared = .012)
b R Squared = .007 (Adjusted R Squared = -.004)
c R Squared = .015 (Adjusted R Squared = .004)

11.3.1.6 Maternal attachment versus relative sympathies

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreEnvirontSympathy	1.322	3	.441	.434	.729
	FactorScoreAnimalSympathy	.554	3	.185	.183	.908
	FactorScoreHumanSympathy	1.842	3	.614	.619	.603
Intercept	FactorScoreEnvirontSympathy	.556	1	.556	.547	.460
	FactorScoreAnimalSympathy	.228	1	.228	.226	.635
	FactorScoreHumanSympathy	.186	1	.186	.188	.665
MATTCHMT	FactorScoreEnvirontSympathy	1.322	3	.441	.434	.729
	FactorScoreAnimalSympathy	.554	3	.185	.183	.908
	FactorScoreHumanSympathy	1.842	3	.614	.619	.603
Error	FactorScoreEnvirontSympathy	280.441	276	1.016		
	FactorScoreAnimalSympathy	278.480	276	1.009		

	FactorScoreHumanSympathy	273.805		276.992
Total	FactorScoreEnvirontSympathy	281.764		280
	FactorScoreAnimalSympathy	279.035		280
	FactorScoreHumanSympathy	275.710		280
Corrected Total	FactorScoreEnvirontSympathy	281.763		279
	FactorScoreAnimalSympathy	279.033		279
	FactorScoreHumanSympathy	275.647		279

a R Squared = .005 (Adjusted R Squared = -.006)
b R Squared = .002 (Adjusted R Squared = -.009)
c R Squared = .007 (Adjusted R Squared = -.004)

11.3.1.7 Paternal attachment versus selected attitudinal and behavioural measures

(Collated ANOVAs)

		Sum of Squares	df	Mean Square	F	Sig.
Sympathy CatOf3	Between Groups	4.183	3	1.394	.583	.627
	Within Groups	663.027	277	2.394		
	Total	667.210	280			
Sympathy CatOf4	Between Groups	9.000	3	3.000	.930	.427
	Within Groups	893.491	277	3.226		
	Total	902.491	280			
EcoEval Max Variance	Between Groups	3.637	3	1.212	1.081	.357
	Within Groups	304.971	272	1.121		
	Total	308.609	275			
EcoEmotion Max Variance	Between Groups	6.657	3	2.219	2.011	.113
	Within Groups	303.536	275	1.104		
	Total	310.194	278			
Parent EcoActive Cat	Between Groups	6.711	3	2.237	1.632	.182
	Within Groups	378.257	276	1.370		
	Total	384.968	279			
EcoActive Now Cat	Between Groups	7.039	3	2.346	2.910	.035
	Within Groups	223.338	277	.806		
	Total	230.377	280			
Outdoorsiness Category	Between Groups	.804	3	.268	.155	.927
	Within Groups	480.477	277	1.735		
	Total	481.281	280			

11.3.1.8 Maternal attachment versus selected attitudinal and behavioural measures

(Collated ANOVAs)

		Sum of Squares	df	Mean Square	F	Sig.
Sympathy CatOf3	Between Groups	1.117	3	.372	.156	.926
	Within Groups	674.943	282	2.393		
	Total	676.059	285			
Sympathy CatOf4	Between Groups	4.150	3	1.383	.436	.728
	Within Groups	898.965	283	3.177		
	Total	903.115	286			
EcoEval Max Variance	Between Groups	1.666	3	.555	.489	.690
	Within Groups	316.701	279	1.135		
	Total	318.367	282			
EcoEmotion Max Variance	Between Groups	8.214	3	2.738	2.463	.063
	Within Groups	313.524	282	1.112		
	Total	321.738	285			
Parent EcoActive Cat	Between Groups	.477	3	.159	.235	.872
	Within Groups	188.307	278	.677		
	Total	188.784	281			
EcoActive Now Cat	Between Groups	2.054	3	.685	.988	.399
	Within Groups	195.358	282	.693		
	Total	197.413	285			
Outdoorsiness Category	Between Groups	12.719	3	4.240	2.486	.061
	Within Groups	482.646	283	1.705		
	Total	495.366	286			

11.3.2 Sum of squares *tables relating to Chapter 6.2*

11.3.2.1 Accessible nature versus ecoevaluation

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreTechnocentric	4.901	2	2.451	2.482	.086
	FactorScoreAnthropocentric	4.168	2	2.084	2.104	.124
	FactorScoreConservationist	5.881	2	2.941	2.991	.052
	FactorScoreEcocentric	.487	2	.243	.242	.785
Intercept	FactorScoreTechnocentric	.584	1	.584	.592	.443
	FactorScoreAnthropocentric	1.492E-02	1	1.492E-02	.015	.902
	FactorScoreConservationist	.257	1	.257	.262	.609
	FactorScoreEcocentric	1.005E-02	1	1.005E-02	.010	.921
URBNRURL	FactorScoreTechnocentric	4.901	2	2.451	2.482	.086
	FactorScoreAnthropocentric	4.168	2	2.084	2.104	.124
	FactorScoreConservationist	5.881	2	2.941	2.991	.052
	FactorScoreEcocentric	.487	2	.243	.242	.785
Error	FactorScoreTechnocentric	226.099	229	.987		
	FactorScoreAnthropocentric	226.832	229	.991		
	FactorScoreConservationist	225.119	229	.983		
	FactorScoreEcocentric	230.513	229	1.007		
Total	FactorScoreTechnocentric	231.000	232			

	FactorScoreAnthropocentric	231.000	232	
	FactorScoreConservationist	231.000	232	
	FactorScoreEcocentric	231.000	232	
Corrected Total	FactorScoreTechnocentric	231.000	231	
	FactorScoreAnthropocentric	231.000	231	
	FactorScoreConservationist	231.000	231	
	FactorScoreEcocentric	231.000	231	

a R Squared = .021 (Adjusted R Squared = .013)
b R Squared = .018 (Adjusted R Squared = .009)
c R Squared = .025 (Adjusted R Squared = .017)
d R Squared = .002 (Adjusted R Squared = -.007)

11.3.2.2 Accessible nature versus ecoemotionality

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreNatureSecure	10.200	2	5.100	5.269	.006
	FactorScoreNatureFearful	10.427	2	5.213	5.391	.005
	FactorScoreNatureDismissive	18.121	2	9.061	9.670	.000
	FactorScoreNatureStoic	2.607	2	1.304	1.307	.273
Intercept	FactorScoreNatureSecure	.819	1	.819	.846	.358
	FactorScoreNatureFearful	1.748	1	1.748	1.807	.180
	FactorScoreNatureDismissive	1.773	1	1.773	1.893	.170
	FactorScoreNatureStoic	8.880E-02	1	8.880E-02	.089	.766
URBNRURL	FactorScoreNatureSecure	10.200	2	5.100	5.269	.006
	FactorScoreNatureFearful	10.427	2	5.213	5.391	.005
	FactorScoreNatureDismissive	18.121	2	9.061	9.670	.000
	FactorScoreNatureStoic	2.607	2	1.304	1.307	.273
Error	FactorScoreNatureSecure	247.800	256	.968		
	FactorScoreNatureFearful	247.573	256	.967		
	FactorScoreNatureDismissive	239.879	256	.937		
	FactorScoreNatureStoic	255.393	256	.998		
Total	FactorScoreNatureSecure	258.000	259			
	FactorScoreNatureFearful	258.000	259			
	FactorScoreNatureDismissive	258.000	259			
	FactorScoreNatureStoic	258.000	259			
Corrected Total	FactorScoreNatureSecure	258.000	258			
	FactorScoreNatureFearful	258.000	258			
	FactorScoreNatureDismissive	258.000	258			
	FactorScoreNatureStoic	258.000	258			

a R Squared = .040 (Adjusted R Squared = .032)
b R Squared = .040 (Adjusted R Squared = .033)
c R Squared = .070 (Adjusted R Squared = .063)
d R Squared = .010 (Adjusted R Squared = .002)

11.3.2.3 Accessible nature versus relative sympathies

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreEnvirontSympathy	25.525	2	12.763	13.920	.000
	FactorScoreAnimalSympathy	6.044E-02	2	3.022E-02	.030	.970
	FactorScoreHumanSympathy	22.580	2	11.290	12.176	.000
Intercept	FactorScoreEnvirontSympathy	2.450	1	2.450	2.672	.103
	FactorScoreAnimalSympathy	4.490E-04	1	4.490E-04	.000	.983
	FactorScoreHumanSympathy	2.324	1	2.324	2.506	.115
URBNRURL	FactorScoreEnvirontSympathy	25.525	2	12.763	13.920	.000
	FactorScoreAnimalSympathy	6.044E-02	2	3.022E-02	.030	.970
	FactorScoreHumanSympathy	22.580	2	11.290	12.176	.000
Error	FactorScoreEnvirontSympathy	259.475	283	.917		
	FactorScoreAnimalSympathy	284.940	283	1.007		
	FactorScoreHumanSympathy	262.420	283	.927		
Total	FactorScoreEnvirontSympathy	285.000	286			
	FactorScoreAnimalSympathy	285.000	286			
	FactorScoreHumanSympathy	285.000	286			
Corrected Total	FactorScoreEnvirontSympathy	285.000	285			
	FactorScoreAnimalSympathy	285.000	285			
	FactorScoreHumanSympathy	285.000	285			

a R Squared = .090 (Adjusted R Squared = .083)
b R Squared = .000 (Adjusted R Squared = -.007)
c R Squared = .079 (Adjusted R Squared = .073)

11.3.2.4 Play versus ecoevaluation

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreTechnocentric	3.818	3	1.273	1.277	.283
	FactorScoreAnthropocentric	.992	3	.331	.328	.805
	FactorScoreConservationist	3.324	3	1.108	1.110	.346
	FactorScoreEcocentric	.236	3	7.863E-02	.078	.972
Intercept	FactorScoreTechnocentric	.261	1	.261	.262	.610
	FactorScoreAnthropocentric	8.376E-02	1	8.376E-02	.083	.773
	FactorScoreConservationist	2.555	1	2.555	2.558	.111
	FactorScoreEcocentric	4.662E-02	1	4.662E-02	.046	.830
Q2.8	FactorScoreTechnocentric	3.818	3	1.273	1.277	.283
	FactorScoreAnthropocentric	.992	3	.331	.328	.805
	FactorScoreConservationist	3.324	3	1.108	1.110	.346
	FactorScoreEcocentric	.236	3	7.863E-02	.078	.972
Error	FactorScoreTechnocentric	227.182	228	.996		
	FactorScoreAnthropocentric	230.008	228	1.009		

	FactorScoreConservationist	227.676	228	.999
	FactorScoreEcocentric	230.764	228	1.012
Total	FactorScoreTechnocentric	231.000	232	
	FactorScoreAnthropocentric	231.000	232	
	FactorScoreConservationist	231.000	232	
	FactorScoreEcocentric	231.000	232	
Corrected Total	FactorScoreTechnocentric	231.000	231	
	FactorScoreAnthropocentric	231.000	231	
	FactorScoreConservationist	231.000	231	
	FactorScoreEcocentric	231.000	231	

a R Squared = .017 (Adjusted R Squared = .004)
b R Squared = .004 (Adjusted R Squared = -.009)
c R Squared = .014 (Adjusted R Squared = .001)
d R Squared = .001 (Adjusted R Squared = -.012)

11.3.2.5 Play versus ecoemotionality

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreNatureSecure	1.280	3	.427	.424	.736
	FactorScoreNatureFearful	12.468	3	4.156	4.316	.005
	FactorScoreNatureDismissive	5.197	3	1.732	1.747	.158
	FactorScoreNatureStoic	2.279	3	.760	.758	.519
Intercept	FactorScoreNatureSecure	1.144	1	1.144	1.137	.287
	FactorScoreNatureFearful	4.771	1	4.771	4.955	.027
	FactorScoreNatureDismissive	2.630	1	2.630	2.653	.105
	FactorScoreNatureStoic	.567	1	.567	.565	.453
Q2.8	FactorScoreNatureSecure	1.280	3	.427	.424	.736
	FactorScoreNatureFearful	12.468	3	4.156	4.316	.005
	FactorScoreNatureDismissive	5.197	3	1.732	1.747	.158
	FactorScoreNatureStoic	2.279	3	.760	.758	.519
Error	FactorScoreNatureSecure	256.720	255	1.007		
	FactorScoreNatureFearful	245.532	255	.963		
	FactorScoreNatureDismissive	252.803	255	.991		
	FactorScoreNatureStoic	255.721	255	1.003		
Total	FactorScoreNatureSecure	258.000	259			
	FactorScoreNatureFearful	258.000	259			
	FactorScoreNatureDismissive	258.000	259			
	FactorScoreNatureStoic	258.000	259			
Corrected Total	FactorScoreNatureSecure	258.000	258			
	FactorScoreNatureFearful	258.000	258			
	FactorScoreNatureDismissive	258.000	258			
	FactorScoreNatureStoic	258.000	258			

a R Squared = .005 (Adjusted R Squared = -.007)
b R Squared = .048 (Adjusted R Squared = .037)
c R Squared = .020 (Adjusted R Squared = .009)

d R Squared = .009 (Adjusted R Squared = -.003)

11.3.2.6 Play versus relative sympathies

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreEnvirontSympathy	1.698	3	.566	.563	.640
	FactorScoreAnimalSympathy	3.960	3	1.320	1.324	.267
	FactorScoreHumanSympathy	1.414	3	.471	.469	.704
Intercept	FactorScoreEnvirontSympathy	2.228E-02	1	2.228E-02	.022	.882
	FactorScoreAnimalSympathy	2.065	1	2.065	2.072	.151
	FactorScoreHumanSympathy	1.051	1	1.051	1.045	.308
Q2.8	FactorScoreEnvirontSympathy	1.698	3	.566	.563	.640
	FactorScoreAnimalSympathy	3.960	3	1.320	1.324	.267
	FactorScoreHumanSympathy	1.414	3	.471	.469	.704
Error	FactorScoreEnvirontSympathy	283.302	282	1.005		
	FactorScoreAnimalSympathy	281.040	282	.997		
	FactorScoreHumanSympathy	283.586	282	1.006		
Total	FactorScoreEnvirontSympathy	285.000	286			
	FactorScoreAnimalSympathy	285.000	286			
	FactorScoreHumanSympathy	285.000	286			
Corrected Total	FactorScoreEnvirontSympathy	285.000	285			
	FactorScoreAnimalSympathy	285.000	285			
	FactorScoreHumanSympathy	285.000	285			

a R Squared = .006 (Adjusted R Squared = -.005)
b R Squared = .014 (Adjusted R Squared = .003)
c R Squared = .005 (Adjusted R Squared = -.006)

11.3.2.7 Wander versus ecoevaluation

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreTechnocentric	4.659	3	1.553	1.564	.199
	FactorScoreAnthropocentric	1.250	3	.417	.414	.743
	FactorScoreConservationist	.404	3	.135	.133	.940
	FactorScoreEcocentric	.118	3	3.930E-02	.039	.990
Intercept	FactorScoreTechnocentric	1.537E-02	1	1.537E-02	.015	.901
	FactorScoreAnthropocentric	8.504E-02	1	8.504E-02	.084	.772
	FactorScoreConservationist	3.068E-03	1	3.068E-03	.003	.956
	FactorScoreEcocentric	2.245E-02	1	2.245E-02	.022	.882
Q2.12	FactorScoreTechnocentric	4.659	3	1.553	1.564	.199
	FactorScoreAnthropocentric	1.250	3	.417	.414	.743

	FactorScoreConservationist	.404	3	.135	.133	.940
	FactorScoreEcocentric	.118	3	3.930E-02	.039	.990
Error	FactorScoreTechnocentric	226.341	228	.993		
	FactorScoreAnthropocentric	229.750	228	1.008		
	FactorScoreConservationist	230.596	228	1.011		
	FactorScoreEcocentric	230.882	228	1.013		
Total	FactorScoreTechnocentric	231.000	232			
	FactorScoreAnthropocentric	231.000	232			
	FactorScoreConservationist	231.000	232			
	FactorScoreEcocentric	231.000	232			
Corrected Total	FactorScoreTechnocentric	231.000	231			
	FactorScoreAnthropocentric	231.000	231			
	FactorScoreConservationist	231.000	231			
	FactorScoreEcocentric	231.000	231			

a R Squared = .020 (Adjusted R Squared = .007)
b R Squared = .005 (Adjusted R Squared = -.008)
c R Squared = .002 (Adjusted R Squared = -.011)
d R Squared = .001 (Adjusted R Squared = -.013)

11.3.2.8 Wander versus ecoemotionality

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreNatureSecure	7.319	3	2.440	2.482	.061
	FactorScoreNatureFearful	8.275	3	2.758	2.817	.040
	FactorScoreNatureDismissive	2.791	3	.930	.929	.427
	FactorScoreNatureStoic	10.063	3	3.354	3.450	.017
Intercept	FactorScoreNatureSecure	1.369	1	1.369	1.393	.239
	FactorScoreNatureFearful	.690	1	.690	.705	.402
	FactorScoreNatureDismissive	1.534E-04	1	1.534E-04	.000	.990
	FactorScoreNatureStoic	1.060	1	1.060	1.090	.297
Q2.12	FactorScoreNatureSecure	7.319	3	2.440	2.482	.061
	FactorScoreNatureFearful	8.275	3	2.758	2.817	.040
	FactorScoreNatureDismissive	2.791	3	.930	.929	.427
	FactorScoreNatureStoic	10.063	3	3.354	3.450	.017
Error	FactorScoreNatureSecure	250.681	255	.983		
	FactorScoreNatureFearful	249.725	255	.979		
	FactorScoreNatureDismissive	255.209	255	1.001		
	FactorScoreNatureStoic	247.937	255	.972		
Total	FactorScoreNatureSecure	258.000	259			
	FactorScoreNatureFearful	258.000	259			
	FactorScoreNatureDismissive	258.000	259			
	FactorScoreNatureStoic	258.000	259			
Corrected Total	FactorScoreNatureSecure	258.000	258			
	FactorScoreNatureFearful	258.000	258			
	FactorScoreNatureDismissive	258.000	258			

	FactorScoreNatureStoic	258.000	258			

a R Squared = .028 (Adjusted R Squared = .017)
b R Squared = .032 (Adjusted R Squared = .021)
c R Squared = .011 (Adjusted R Squared = -.001)
d R Squared = .039 (Adjusted R Squared = .028)

11.3.2.9 Wander versus relative sympathies

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreEnvirontSympathy	4.165	3	1.388	1.394	.245
	FactorScoreAnimalSympathy	4.893	3	1.631	1.642	.180
	FactorScoreHumanSympathy	2.492	3	.831	.829	.479
Intercept	FactorScoreEnvirontSympathy	.693	1	.693	.696	.405
	FactorScoreAnimalSympathy	.140	1	.140	.141	.708
	FactorScoreHumanSympathy	.263	1	.263	.263	.608
Q2.12	FactorScoreEnvirontSympathy	4.165	3	1.388	1.394	.245
	FactorScoreAnimalSympathy	4.893	3	1.631	1.642	.180
	FactorScoreHumanSympathy	2.492	3	.831	.829	.479
Error	FactorScoreEnvirontSympathy	280.835	282	.996		
	FactorScoreAnimalSympathy	280.107	282	.993		
	FactorScoreHumanSympathy	282.508	282	1.002		
Total	FactorScoreEnvirontSympathy	285.000	286			
	FactorScoreAnimalSympathy	285.000	286			
	FactorScoreHumanSympathy	285.000	286			
Corrected Total	FactorScoreEnvirontSympathy	285.000	285			
	FactorScoreAnimalSympathy	285.000	285			
	FactorScoreHumanSympathy	285.000	285			

a R Squared = .015 (Adjusted R Squared = .004)
b R Squared = .017 (Adjusted R Squared = .007)
c R Squared = .009 (Adjusted R Squared = -.002)

11.3.3 Sum of squares *tables relating to Chapter 6.3*

11.3.3.1 Parental ecoactivity and ecoevaluation

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreTechnocentric	4.140	3	1.380	1.384	.249
	FactorScoreAnthropocentric	.861	3	.287	.286	.836
	FactorScoreConservationist	3.197	3	1.066	1.065	.365

	FactorScoreEcocentric	9.695	3	3.232	3.304	.021
Intercept	FactorScoreTechnocentric	.266	1	.266	.267	.606
	FactorScoreAnthropocentric	.282	1	.282	.281	.597
	FactorScoreConservationist	3.248E-02	1	3.248E-02	.032	.857
	FactorScoreEcocentric	5.361	1	5.361	5.480	.020
PTECOACC	FactorScoreTechnocentric	4.140	3	1.380	1.384	.249
	FactorScoreAnthropocentric	.861	3	.287	.286	.836
	FactorScoreConservationist	3.197	3	1.066	1.065	.365
	FactorScoreEcocentric	9.695	3	3.232	3.304	.021
Error	FactorScoreTechnocentric	224.375	225	.997		
	FactorScoreAnthropocentric	226.096	225	1.005		
	FactorScoreConservationist	225.110	225	1.000		
	FactorScoreEcocentric	220.099	225	.978		
Total	FactorScoreTechnocentric	228.529	229			
	FactorScoreAnthropocentric	226.966	229			
	FactorScoreConservationist	228.307	229			
	FactorScoreEcocentric	229.803	229			
Corrected Total	FactorScoreTechnocentric	228.514	228			
	FactorScoreAnthropocentric	226.956	228			
	FactorScoreConservationist	228.307	228			
	FactorScoreEcocentric	229.794	228			

a R Squared = .018 (Adjusted R Squared = .005)
b R Squared = .004 (Adjusted R Squared = -.009)
c R Squared = .014 (Adjusted R Squared = .001)
d R Squared = .042 (Adjusted R Squared = .029)

11.3.3.2 Parental ecoactivity and ecoemotionality

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreNatureSecure	8.007	3	2.669	2.722	.045
	FactorScoreNatureFearful	4.866	3	1.622	1.619	.185
	FactorScoreNatureDismissive	2.029	3	.676	.682	.564
	FactorScoreNatureStoic	2.452	3	.817	.804	.493
Intercept	FactorScoreNatureSecure	2.870	1	2.870	2.927	.088
	FactorScoreNatureFearful	1.303E-03	1	1.303E-03	.001	.971
	FactorScoreNatureDismissive	.597	1	.597	.602	.439
	FactorScoreNatureStoic	.701	1	.701	.690	.407
PTECOACC	FactorScoreNatureSecure	8.007	3	2.669	2.722	.045
	FactorScoreNatureFearful	4.866	3	1.622	1.619	.185
	FactorScoreNatureDismissive	2.029	3	.676	.682	.564
	FactorScoreNatureStoic	2.452	3	.817	.804	.493
Error	FactorScoreNatureSecure	245.134	250	.981		
	FactorScoreNatureFearful	250.449	250	1.002		
	FactorScoreNatureDismissive	247.760	250	.991		
	FactorScoreNatureStoic	254.040	250	1.016		
Total	FactorScoreNatureSecure	253.192	254			

	FactorScoreNatureFearful	255.320	254	
	FactorScoreNatureDismissive	249.887	254	
	FactorScoreNatureStoic	256.492	254	
Corrected Total	FactorScoreNatureSecure	253.141	253	
	FactorScoreNatureFearful	255.315	253	
	FactorScoreNatureDismissive	249.789	253	
	FactorScoreNatureStoic	256.492	253	

a R Squared = .032 (Adjusted R Squared = .020)
b R Squared = .019 (Adjusted R Squared = .007)
c R Squared = .008 (Adjusted R Squared = -.004)
d R Squared = .010 (Adjusted R Squared = -.002)

11.3.3.3 Parental ecoactivity and relative sympathies

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreEnvirontSympathy	4.521	3	1.507	1.518	.210
	FactorScoreAnimalSympathy	1.589	3	.530	.520	.669
	FactorScoreHumanSympathy	.744	3	.248	.244	.866
Intercept	FactorScoreEnvirontSympathy	2.304	1	2.304	2.321	.129
	FactorScoreAnimalSympathy	.454	1	.454	.445	.505
	FactorScoreHumanSympathy	.105	1	.105	.103	.748
PTECOACC	FactorScoreEnvirontSympathy	4.521	3	1.507	1.518	.210
	FactorScoreAnimalSympathy	1.589	3	.530	.520	.669
	FactorScoreHumanSympathy	.744	3	.248	.244	.866
Error	FactorScoreEnvirontSympathy	273.994	276	.993		
	FactorScoreAnimalSympathy	281.340	276	1.019		
	FactorScoreHumanSympathy	280.716	276	1.017		
Total	FactorScoreEnvirontSympathy	278.515	280			
	FactorScoreAnimalSympathy	282.930	280			
	FactorScoreHumanSympathy	281.471	280			
Corrected Total	FactorScoreEnvirontSympathy	278.515	279			
	FactorScoreAnimalSympathy	282.929	279			
	FactorScoreHumanSympathy	281.461	279			

a R Squared = .016 (Adjusted R Squared = .006)
b R Squared = .006 (Adjusted R Squared = -.005)
c R Squared = .003 (Adjusted R Squared = -.008)

11.3.3.4 Nature mentor and ecoevaluation

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.

Corrected Model	FactorScoreTechnocentric	.563	1	.563	.560	.455
	FactorScoreAnthropocentric	.154	1	.154	.153	.696
	FactorScoreConservationist	1.034	1	1.034	1.031	.311
	FactorScoreEcocentric	1.842E-05	1	1.842E-05	.000	.997
Intercept	FactorScoreTechnocentric	5.777E-02	1	5.777E-02	.057	.811
	FactorScoreAnthropocentric	1.683E-02	1	1.683E-02	.017	.897
	FactorScoreConservationist	.133	1	.133	.132	.716
	FactorScoreEcocentric	5.535E-03	1	5.535E-03	.006	.941
Q2.27	FactorScoreTechnocentric	.563	1	.563	.560	.455
	FactorScoreAnthropocentric	.154	1	.154	.153	.696
	FactorScoreConservationist	1.034	1	1.034	1.031	.311
	FactorScoreEcocentric	1.842E-05	1	1.842E-05	.000	.997
Error	FactorScoreTechnocentric	230.411	229	1.006		
	FactorScoreAnthropocentric	230.845	229	1.008		
	FactorScoreConservationist	229.798	229	1.003		
	FactorScoreEcocentric	229.499	229	1.002		
Total	FactorScoreTechnocentric	230.975	231			
	FactorScoreAnthropocentric	231.000	231			
	FactorScoreConservationist	230.833	231			
	FactorScoreEcocentric	229.506	231			
Corrected Total	FactorScoreTechnocentric	230.975	230			
	FactorScoreAnthropocentric	231.000	230			
	FactorScoreConservationist	230.832	230			
	FactorScoreEcocentric	229.499	230			

a R Squared = .002 (Adjusted R Squared = -.002)
b R Squared = .001 (Adjusted R Squared = -.004)
c R Squared = .004 (Adjusted R Squared = .000)
d R Squared = .000 (Adjusted R Squared = -.004)

11.3.3.5 Nature mentor and ecoemotionality

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreNatureSecure	3.508	1	3.508	3.539	.061
	FactorScoreNatureFearful	.947	1	.947	.952	.330
	FactorScoreNatureDismissive	3.176	1	3.176	3.191	.075
	FactorScoreNatureStoic	.150	1	.150	.151	.698
Intercept	FactorScoreNatureSecure	.314	1	.314	.317	.574
	FactorScoreNatureFearful	6.776E-02	1	6.776E-02	.068	.794
	FactorScoreNatureDismissive	.329	1	.329	.330	.566
	FactorScoreNatureStoic	9.487E-04	1	9.487E-04	.001	.975
Q2.27	FactorScoreNatureSecure	3.508	1	3.508	3.539	.061
	FactorScoreNatureFearful	.947	1	.947	.952	.330
	FactorScoreNatureDismissive	3.176	1	3.176	3.191	.075
	FactorScoreNatureStoic	.150	1	.150	.151	.698
Error	FactorScoreNatureSecure	252.724	255	.991		

	FactorScoreNatureFearful	253.823	255	.995
	FactorScoreNatureDismissive	253.806	255	.995
	FactorScoreNatureStoic	253.842	255	.995
Total	FactorScoreNatureSecure	256.244	257	
	FactorScoreNatureFearful	254.779	257	
	FactorScoreNatureDismissive	256.987	257	
	FactorScoreNatureStoic	254.005	257	
Corrected Total	FactorScoreNatureSecure	256.232	256	
	FactorScoreNatureFearful	254.771	256	
	FactorScoreNatureDismissive	256.983	256	
	FactorScoreNatureStoic	253.992	256	

a R Squared = .014 (Adjusted R Squared = .010)
b R Squared = .004 (Adjusted R Squared = .000)
c R Squared = .012 (Adjusted R Squared = .008)
d R Squared = .001 (Adjusted R Squared = -.003)

11.3.3.6 Nature mentor and relative sympathies

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreEnvirontSympathy	1.926	1	1.926	1.921	.167
	FactorScoreAnimalSympathy	.542	1	.542	.538	.464
	FactorScoreHumanSympathy	7.704	1	7.704	7.850	.005
Intercept	FactorScoreEnvirontSympathy	.230	1	.230	.230	.632
	FactorScoreAnimalSympathy	7.686E-02	1	7.686E-02	.076	.783
	FactorScoreHumanSympathy	1.047	1	1.047	1.067	.303
Q2.27	FactorScoreEnvirontSympathy	1.926	1	1.926	1.921	.167
	FactorScoreAnimalSympathy	.542	1	.542	.538	.464
	FactorScoreHumanSympathy	7.704	1	7.704	7.850	.005
Error	FactorScoreEnvirontSympathy	282.663	282	1.002		
	FactorScoreAnimalSympathy	284.165	282	1.008		
	FactorScoreHumanSympathy	276.773	282	.981		
Total	FactorScoreEnvirontSympathy	284.589	284			
	FactorScoreAnimalSympathy	284.707	284			
	FactorScoreHumanSympathy	284.477	284			
Corrected Total	FactorScoreEnvirontSympathy	284.589	283			
	FactorScoreAnimalSympathy	284.707	283			
	FactorScoreHumanSympathy	284.477	283			

a R Squared = .007 (Adjusted R Squared = .003)
b R Squared = .002 (Adjusted R Squared = -.002)
c R Squared = .027 (Adjusted R Squared = .024)

11.3.3.7 Ecoparenting and ecoevaluation

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreTechnocentric	3.050	3	1.017	1.036	.378
	FactorScoreAnthropocentric	.591	3	.197	.199	.897
	FactorScoreConservationist	2.579	3	.860	.864	.461
	FactorScoreEcocentric	2.424	3	.808	.753	.522
Intercept	FactorScoreTechnocentric	.451	1	.451	.460	.499
	FactorScoreAnthropocentric	1.322	1	1.322	1.334	.250
	FactorScoreConservationist	.597	1	.597	.601	.439
	FactorScoreEcocentric	2.199E-02	1	2.199E-02	.020	.886
ECOPRNTS	FactorScoreTechnocentric	3.050	3	1.017	1.036	.378
	FactorScoreAnthropocentric	.591	3	.197	.199	.897
	FactorScoreConservationist	2.579	3	.860	.864	.461
	FactorScoreEcocentric	2.424	3	.808	.753	.522
Error	FactorScoreTechnocentric	157.973	161	.981		
	FactorScoreAnthropocentric	159.511	161	.991		
	FactorScoreConservationist	160.159	161	.995		
	FactorScoreEcocentric	172.798	161	1.073		
Total	FactorScoreTechnocentric	161.105	165			
	FactorScoreAnthropocentric	161.948	165			
	FactorScoreConservationist	162.746	165			
	FactorScoreEcocentric	175.244	165			
Corrected Total	FactorScoreTechnocentric	161.023	164			
	FactorScoreAnthropocentric	160.102	164			
	FactorScoreConservationist	162.738	164			
	FactorScoreEcocentric	175.222	164			

a R Squared = .019 (Adjusted R Squared = .001)
b R Squared = .004 (Adjusted R Squared = -.015)
c R Squared = .016 (Adjusted R Squared = -.002)
d R Squared = .014 (Adjusted R Squared = -.005)

11.3.3.8 Ecoparenting and ecoemotionality

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreNatureSecure	.764	3	.255	.243	.866
	FactorScoreNatureFearful	3.002	3	1.001	.875	.455
	FactorScoreNatureDismissive	6.166	3	2.055	2.179	.092
	FactorScoreNatureStoic	.792	3	.264	.278	.841
Intercept	FactorScoreNatureSecure	3.059E-03	1	3.059E-03	.003	.957
	FactorScoreNatureFearful	4.566E-02	1	4.566E-02	.040	.842
	FactorScoreNatureDismissive	1.527	1	1.527	1.619	.205

	FactorScoreNatureStoic	.259	1	.259	.273	.602
ECOPRNTS	FactorScoreNatureSecure	.764	3	.255	.243	.866
	FactorScoreNatureFearful	3.002	3	1.001	.875	.455
	FactorScoreNatureDismissive	6.166	3	2.055	2.179	.092
	FactorScoreNatureStoic	.792	3	.264	.278	.841
Error	FactorScoreNatureSecure	187.573	179	1.048		
	FactorScoreNatureFearful	204.711	179	1.144		
	FactorScoreNatureDismissive	168.806	179	.943		
	FactorScoreNatureStoic	170.230	179	.951		
Total	FactorScoreNatureSecure	188.576	183			
	FactorScoreNatureFearful	208.260	183			
	FactorScoreNatureDismissive	175.297	183			
	FactorScoreNatureStoic	171.235	183			
Corrected Total	FactorScoreNatureSecure	188.337	182			
	FactorScoreNatureFearful	207.712	182			
	FactorScoreNatureDismissive	174.972	182			
	FactorScoreNatureStoic	171.022	182			

a R Squared = .004 (Adjusted R Squared = -.013)
b R Squared = .014 (Adjusted R Squared = -.002)
c R Squared = .035 (Adjusted R Squared = .019)
d R Squared = .005 (Adjusted R Squared = -.012)

11.3.3.9 Ecoparenting and relative sympathies

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreEnvirontSympathy	2.192	3	.731	.733	.533
	FactorScoreAnimalSympathy	14.713	3	4.904	5.421	.001
	FactorScoreHumanSympathy	1.970	3	.657	.715	.544
Intercept	FactorScoreEnvirontSympathy	.329	1	.329	.330	.566
	FactorScoreAnimalSympathy	9.532	1	9.532	10.537	.001
	FactorScoreHumanSympathy	.538	1	.538	.586	.445
ECOPRNTS	FactorScoreEnvirontSympathy	2.192	3	.731	.733	.533
	FactorScoreAnimalSympathy	14.713	3	4.904	5.421	.001
	FactorScoreHumanSympathy	1.970	3	.657	.715	.544
Error	FactorScoreEnvirontSympathy	197.403	198	.997		
	FactorScoreAnimalSympathy	179.112	198	.905		
	FactorScoreHumanSympathy	181.737	198	.918		
Total	FactorScoreEnvirontSympathy	199.958	202			
	FactorScoreAnimalSympathy	194.131	202			
	FactorScoreHumanSympathy	183.836	202			
Corrected Total	FactorScoreEnvirontSympathy	199.596	201			
	FactorScoreAnimalSympathy	193.825	201			
	FactorScoreHumanSympathy	183.707	201			

a R Squared = .011 (Adjusted R Squared = -.004)
b R Squared = .076 (Adjusted R Squared = .062)

11.3.4 Sum of squares *tables relating to Chapter 7*

11.3.4.1 Nature hobbies and ecoevaluation

11.3.4.1.1 Nature hobby (Q2.20)

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreTechnocentric	1.931E-02	1	1.931E-02	.019	.891
	FactorScoreAnthropocentric	.738	1	.738	.728	.395
	FactorScoreConservationist	.486	1	.486	.481	.489
	FactorScoreEcocentric	3.197E-03	1	3.197E-03	.003	.955
Intercept	FactorScoreTechnocentric	1.632E-03	1	1.632E-03	.002	.968
	FactorScoreAnthropocentric	1.822E-04	1	1.822E-04	.000	.989
	FactorScoreConservationist	1.047E-03	1	1.047E-03	.001	.974
	FactorScoreEcocentric	1.004E-02	1	1.004E-02	.010	.920
Q2.20	FactorScoreTechnocentric	1.931E-02	1	1.931E-02	.019	.891
	FactorScoreAnthropocentric	.738	1	.738	.728	.395
	FactorScoreConservationist	.486	1	.486	.481	.489
	FactorScoreEcocentric	3.197E-03	1	3.197E-03	.003	.955
Error	FactorScoreTechnocentric	224.208	220	1.019		
	FactorScoreAnthropocentric	222.926	220	1.013		
	FactorScoreConservationist	222.354	220	1.011		
	FactorScoreEcocentric	219.518	220	.998		
Total	FactorScoreTechnocentric	224.227	222			
	FactorScoreAnthropocentric	223.712	222			
	FactorScoreConservationist	222.881	222			
	FactorScoreEcocentric	219.529	222			
Corrected Total	FactorScoreTechnocentric	224.227	221			
	FactorScoreAnthropocentric	223.663	221			
	FactorScoreConservationist	222.840	221			
	FactorScoreEcocentric	219.521	221			

a R Squared = .000 (Adjusted R Squared = -.004)
b R Squared = .003 (Adjusted R Squared = -.001)
c R Squared = .002 (Adjusted R Squared = -.002)
d R Squared = .000 (Adjusted R Squared = -.005)

11.3.4.1.2 Hobby frequency (Q2.21)

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of	df	Mean	F	Sig.

		Squares		Square		
Corrected Model	FactorScoreTechnocentric	2.524	3	.841	.809	.491
	FactorScoreAnthropocentric	3.978	3	1.326	1.303	.276
	FactorScoreConservationist	.643	3	.214	.211	.888
	FactorScoreEcocentric	5.453	3	1.818	1.826	.145
Intercept	FactorScoreTechnocentric	4.848E-02	1	4.848E-02	.047	.829
	FactorScoreAnthropocentric	1.468	1	1.468	1.442	.232
	FactorScoreConservationist	1.092E-03	1	1.092E-03	.001	.974
	FactorScoreEcocentric	.805	1	.805	.808	.370
Q2.21	FactorScoreTechnocentric	2.524	3	.841	.809	.491
	FactorScoreAnthropocentric	3.978	3	1.326	1.303	.276
	FactorScoreConservationist	.643	3	.214	.211	.888
	FactorScoreEcocentric	5.453	3	1.818	1.826	.145
Error	FactorScoreTechnocentric	141.409	136	1.040		
	FactorScoreAnthropocentric	138.452	136	1.018		
	FactorScoreConservationist	137.970	136	1.014		
	FactorScoreEcocentric	135.397	136	.996		
Total	FactorScoreTechnocentric	143.992	140			
	FactorScoreAnthropocentric	142.708	140			
	FactorScoreConservationist	138.699	140			
	FactorScoreEcocentric	140.925	140			
Corrected Total	FactorScoreTechnocentric	143.933	139			
	FactorScoreAnthropocentric	142.431	139			
	FactorScoreConservationist	138.613	139			
	FactorScoreEcocentric	140.849	139			

a R Squared = .018 (Adjusted R Squared = -.004)
b R Squared = .028 (Adjusted R Squared = .006)
c R Squared = .005 (Adjusted R Squared = -.017)
d R Squared = .039 (Adjusted R Squared = .018)

11.3.4.1.3 Favourite hobby (Q2.22)

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreTechnocentric	11.055	6	1.842	1.768	.111
	FactorScoreAnthropocentric	13.390	6	2.232	2.349	.035
	FactorScoreConservationist	6.137	6	1.023	1.007	.424
	FactorScoreEcocentric	7.851	6	1.308	1.302	.261
Intercept	FactorScoreTechnocentric	1.482E-06	1	1.482E-06	.000	.999
	FactorScoreAnthropocentric	3.507E-02	1	3.507E-02	.037	.848
	FactorScoreConservationist	3.858E-03	1	3.858E-03	.004	.951
	FactorScoreEcocentric	.915	1	.915	.910	.342
Q2.22	FactorScoreTechnocentric	11.055	6	1.842	1.768	.111
	FactorScoreAnthropocentric	13.390	6	2.232	2.349	.035
	FactorScoreConservationist	6.137	6	1.023	1.007	.424
	FactorScoreEcocentric	7.851	6	1.308	1.302	.261

Error	FactorScoreTechnocentric	131.278	126	1.042
	FactorScoreAnthropocentric	119.705	126	.950
	FactorScoreConservationist	127.962	126	1.016
	FactorScoreEcocentric	126.656	126	1.005
Total	FactorScoreTechnocentric	142.381	133	
	FactorScoreAnthropocentric	133.654	133	
	FactorScoreConservationist	134.238	133	
	FactorScoreEcocentric	134.508	133	
Corrected Total	FactorScoreTechnocentric	142.333	132	
	FactorScoreAnthropocentric	133.095	132	
	FactorScoreConservationist	134.099	132	
	FactorScoreEcocentric	134.506	132	

a R Squared = .078 (Adjusted R Squared = .034)
b R Squared = .101 (Adjusted R Squared = .058)
c R Squared = .046 (Adjusted R Squared = .000)
d R Squared = .058 (Adjusted R Squared = .014)

11.3.4.2 Nature hobbies and ecoemotionality

11.3.4.2.1 Nature hobby (Q2.20)

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreNatureSecure	5.789	1	5.789	5.945	.015
	FactorScoreNatureFearful	2.379	1	2.379	2.341	.127
	FactorScoreNatureDismissive	9.815E-02	1	9.815E-02	.100	.753
	FactorScoreNatureStoic	2.328	1	2.328	2.302	.130
Intercept	FactorScoreNatureSecure	.106	1	.106	.109	.742
	FactorScoreNatureFearful	.207	1	.207	.203	.652
	FactorScoreNatureDismissive	6.748E-02	1	6.748E-02	.068	.794
	FactorScoreNatureStoic	.235	1	.235	.233	.630
Q2.20	FactorScoreNatureSecure	5.789	1	5.789	5.945	.015
	FactorScoreNatureFearful	2.379	1	2.379	2.341	.127
	FactorScoreNatureDismissive	9.815E-02	1	9.815E-02	.100	.753
	FactorScoreNatureStoic	2.328	1	2.328	2.302	.130
Error	FactorScoreNatureSecure	241.485	248	.974		
	FactorScoreNatureFearful	251.972	248	1.016		
	FactorScoreNatureDismissive	244.373	248	.985		
	FactorScoreNatureStoic	250.725	248	1.011		
Total	FactorScoreNatureSecure	247.378	250			
	FactorScoreNatureFearful	254.353	250			
	FactorScoreNatureDismissive	244.505	250			
	FactorScoreNatureStoic	253.060	250			
Corrected Total	FactorScoreNatureSecure	247.275	249			

	FactorScoreNatureFearful	254.350	249			
	FactorScoreNatureDismissive	244.471	249			
	FactorScoreNatureStoic	253.052	249			

a R Squared = .023 (Adjusted R Squared = .019)
b R Squared = .009 (Adjusted R Squared = .005)
c R Squared = .000 (Adjusted R Squared = -.004)

11.3.4.2.2 Hobby frequency (Q2.21)

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreNatureSecure	2.501	3	.834	.907	.439
	FactorScoreNatureFearful	4.566	3	1.522	1.598	.192
	FactorScoreNatureDismissive	3.325	3	1.108	1.044	.375
	FactorScoreNatureStoic	5.850	3	1.950	2.069	.107
Intercept	FactorScoreNatureSecure	.253	1	.253	.275	.601
	FactorScoreNatureFearful	2.135	1	2.135	2.242	.136
	FactorScoreNatureDismissive	1.827	1	1.827	1.720	.192
	FactorScoreNatureStoic	3.222	1	3.222	3.418	.066
Q2.21	FactorScoreNatureSecure	2.501	3	.834	.907	.439
	FactorScoreNatureFearful	4.566	3	1.522	1.598	.192
	FactorScoreNatureDismissive	3.325	3	1.108	1.044	.375
	FactorScoreNatureStoic	5.850	3	1.950	2.069	.107
Error	FactorScoreNatureSecure	144.348	157	.919		
	FactorScoreNatureFearful	149.510	157	.952		
	FactorScoreNatureDismissive	166.758	157	1.062		
	FactorScoreNatureStoic	147.982	157	.943		
Total	FactorScoreNatureSecure	149.767	161			
	FactorScoreNatureFearful	154.632	161			
	FactorScoreNatureDismissive	170.083	161			
	FactorScoreNatureStoic	154.079	161			
Corrected Total	FactorScoreNatureSecure	146.849	160			
	FactorScoreNatureFearful	154.077	160			
	FactorScoreNatureDismissive	170.083	160			
	FactorScoreNatureStoic	153.832	160			

a R Squared = .017 (Adjusted R Squared = -.002)
b R Squared = .030 (Adjusted R Squared = .011)
c R Squared = .020 (Adjusted R Squared = .001)
d R Squared = .038 (Adjusted R Squared = .020)

11.3.4.2.3 Favourite hobby (Q2.22)

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of	df	Mean	F	Sig.

		Squares		Square		
Corrected Model	FactorScoreNatureSecure	7.063	6	1.177	1.277	.272
	FactorScoreNatureFearful	5.251	6	.875	.906	.492
	FactorScoreNatureDismissive	3.165	6	.527	.482	.821
	FactorScoreNatureStoic	6.583	6	1.097	1.151	.336
Intercept	FactorScoreNatureSecure	.144	1	.144	.156	.693
	FactorScoreNatureFearful	.745	1	.745	.771	.381
	FactorScoreNatureDismissive	.295	1	.295	.270	.604
	FactorScoreNatureStoic	2.644	1	2.644	2.775	.098
Q2.22	FactorScoreNatureSecure	7.063	6	1.177	1.277	.272
	FactorScoreNatureFearful	5.251	6	.875	.906	.492
	FactorScoreNatureDismissive	3.165	6	.527	.482	.821
	FactorScoreNatureStoic	6.583	6	1.097	1.151	.336
Error	FactorScoreNatureSecure	135.545	147	.922		
	FactorScoreNatureFearful	141.992	147	.966		
	FactorScoreNatureDismissive	160.891	147	1.094		
	FactorScoreNatureStoic	140.081	147	.953		
Total	FactorScoreNatureSecure	145.073	154			
	FactorScoreNatureFearful	147.956	154			
	FactorScoreNatureDismissive	164.203	154			
	FactorScoreNatureStoic	147.175	154			
Corrected Total	FactorScoreNatureSecure	142.608	153			
	FactorScoreNatureFearful	147.243	153			
	FactorScoreNatureDismissive	164.056	153			
	FactorScoreNatureStoic	146.664	153			

a R Squared = .050 (Adjusted R Squared = .011)
b R Squared = .036 (Adjusted R Squared = -.004)
c R Squared = .019 (Adjusted R Squared = -.021)
d R Squared = .045 (Adjusted R Squared = .006)

11.3.4.3 Nature hobbies and relative sympathies

11.3.4.3.1 Nature hobby (Q2.20)

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreEnvirontSympathy	8.715	1	8.715	9.116	.003
	FactorScoreAnimalSympathy	.365	1	.365	.357	.551
	FactorScoreHumanSympathy	4.842	1	4.842	4.949	.027
Intercept	FactorScoreEnvirontSympathy	.462	1	.462	.483	.488
	FactorScoreAnimalSympathy	.164	1	.164	.160	.689
	FactorScoreHumanSympathy	.550	1	.550	.562	.454
Q2.20	FactorScoreEnvirontSympathy	8.715	1	8.715	9.116	.003
	FactorScoreAnimalSympathy	.365	1	.365	.357	.551

	FactorScoreHumanSympathy	4.842	1	4.842	4.949	.027
Error	FactorScoreEnvirontSympathy	261.946	274	.956		
	FactorScoreAnimalSympathy	279.879	274	1.021		
	FactorScoreHumanSympathy	268.064	274	.978		
Total	FactorScoreEnvirontSympathy	270.661	276			
	FactorScoreAnimalSympathy	280.318	276			
	FactorScoreHumanSympathy	272.962	276			
Corrected Total	FactorScoreEnvirontSympathy	270.661	275			
	FactorScoreAnimalSympathy	280.244	275			
	FactorScoreHumanSympathy	272.905	275			

a R Squared = .032 (Adjusted R Squared = .029)
b R Squared = .001 (Adjusted R Squared = -.002)
c R Squared = .018 (Adjusted R Squared = .014)

11.3.4.3.2 Hobby frequency (Q2.21)

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreEnvirontSympathy	4.508	3	1.503	1.377	.251
	FactorScoreAnimalSympathy	8.414	3	2.805	2.961	.034
	FactorScoreHumanSympathy	8.839	3	2.946	3.362	.020
Intercept	FactorScoreEnvirontSympathy	.211	1	.211	.194	.660
	FactorScoreAnimalSympathy	1.548	1	1.548	1.635	.203
	FactorScoreHumanSympathy	2.303	1	2.303	2.628	.107
Q2.21	FactorScoreEnvirontSympathy	4.508	3	1.503	1.377	.251
	FactorScoreAnimalSympathy	8.414	3	2.805	2.961	.034
	FactorScoreHumanSympathy	8.839	3	2.946	3.362	.020
Error	FactorScoreEnvirontSympathy	186.537	171	1.091		
	FactorScoreAnimalSympathy	161.953	171	.947		
	FactorScoreHumanSympathy	149.859	171	.876		
Total	FactorScoreEnvirontSympathy	194.679	175			
	FactorScoreAnimalSympathy	170.453	175			
	FactorScoreHumanSympathy	159.543	175			
Corrected Total	FactorScoreEnvirontSympathy	191.044	174			
	FactorScoreAnimalSympathy	170.367	174			
	FactorScoreHumanSympathy	158.698	174			

a R Squared = .024 (Adjusted R Squared = .006)
b R Squared = .049 (Adjusted R Squared = .033)
c R Squared = .056 (Adjusted R Squared = .039)

11.3.4.3.3 Favourite hobby (Q2.22)

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreEnvirontSympathy	11.953	6	1.992	1.912	.082
	FactorScoreAnimalSympathy	9.409	6	1.568	2.150	.051
	FactorScoreHumanSympathy	5.077	6	.846	.938	.469
Intercept	FactorScoreEnvirontSympathy	8.604	1	8.604	8.258	.005
	FactorScoreAnimalSympathy	.549	1	.549	.753	.387
	FactorScoreHumanSympathy	2.304	1	2.304	2.555	.112
Q2.22	FactorScoreEnvirontSympathy	11.953	6	1.992	1.912	.082
	FactorScoreAnimalSympathy	9.409	6	1.568	2.150	.051
	FactorScoreHumanSympathy	5.077	6	.846	.938	.469
Error	FactorScoreEnvirontSympathy	164.629	158	1.042		
	FactorScoreAnimalSympathy	115.234	158	.729		
	FactorScoreHumanSympathy	142.448	158	.902		
Total	FactorScoreEnvirontSympathy	179.050	165			
	FactorScoreAnimalSympathy	125.166	165			
	FactorScoreHumanSympathy	149.157	165			
Corrected Total	FactorScoreEnvirontSympathy	176.583	164			
	FactorScoreAnimalSympathy	124.644	164			
	FactorScoreHumanSympathy	147.525	164			

a R Squared = .068 (Adjusted R Squared = .032)
b R Squared = .075 (Adjusted R Squared = .040)
c R Squared = .034 (Adjusted R Squared = -.002)

11.3.4.4 Nature media and ecoevaluation

11.3.4.4.1 Read Books (Q2.23)

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreTechnocentric	2.634	3	.878	.869	.458
	FactorScoreAnthropocentric	1.601	3	.534	.538	.657
	FactorScoreConservationist	2.033	3	.678	.671	.571
	FactorScoreEcocentric	9.144E-02	3	3.048E-02	.031	.993
Intercept	FactorScoreTechnocentric	.492	1	.492	.487	.486
	FactorScoreAnthropocentric	7.920E-03	1	7.920E-03	.008	.929
	FactorScoreConservationist	.493	1	.493	.488	.485
	FactorScoreEcocentric	1.318E-02	1	1.318E-02	.013	.909
Q2.23	FactorScoreTechnocentric	2.634	3	.878	.869	.458
	FactorScoreAnthropocentric	1.601	3	.534	.538	.657
	FactorScoreConservationist	2.033	3	.678	.671	.571
	FactorScoreEcocentric	9.144E-02	3	3.048E-02	.031	.993
Error	FactorScoreTechnocentric	225.398	223	1.011		
	FactorScoreAnthropocentric	221.203	223	.992		

	FactorScoreConservationist	225.237	223	1.010
	FactorScoreEcocentric	222.002	223	.996
Total	FactorScoreTechnocentric	228.042	227	
	FactorScoreAnthropocentric	222.808	227	
	FactorScoreConservationist	227.270	227	
	FactorScoreEcocentric	222.106	227	
Corrected Total	FactorScoreTechnocentric	228.032	226	
	FactorScoreAnthropocentric	222.805	226	
	FactorScoreConservationist	227.270	226	
	FactorScoreEcocentric	222.093	226	

a R Squared = .012 (Adjusted R Squared = -.002)
b R Squared = .007 (Adjusted R Squared = -.006)
c R Squared = .009 (Adjusted R Squared = -.004)
d R Squared = .000 (Adjusted R Squared = -.013)

11.3.4.4.2 TV (Q2.24)

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreTechnocentric	.183	1	.183	.184	.668
	FactorScoreAnthropocentric	14.730	1	14.730	15.405	.000
	FactorScoreConservationist	.563	1	.563	.556	.457
	FactorScoreEcocentric	.197	1	.197	.203	.652
Intercept	FactorScoreTechnocentric	1.569E-02	1	1.569E-02	.016	.900
	FactorScoreAnthropocentric	4.006	1	4.006	4.189	.042
	FactorScoreConservationist	.132	1	.132	.130	.719
	FactorScoreEcocentric	.177	1	.177	.183	.669
Q2.24	FactorScoreTechnocentric	.183	1	.183	.184	.668
	FactorScoreAnthropocentric	14.730	1	14.730	15.405	.000
	FactorScoreConservationist	.563	1	.563	.556	.457
	FactorScoreEcocentric	.197	1	.197	.203	.652
Error	FactorScoreTechnocentric	224.800	226	.995		
	FactorScoreAnthropocentric	216.098	226	.956		
	FactorScoreConservationist	229.102	226	1.014		
	FactorScoreEcocentric	218.706	226	.968		
Total	FactorScoreTechnocentric	224.995	228			
	FactorScoreAnthropocentric	230.829	228			
	FactorScoreConservationist	229.666	228			
	FactorScoreEcocentric	218.953	228			
Corrected Total	FactorScoreTechnocentric	224.983	227			
	FactorScoreAnthropocentric	230.828	227			
	FactorScoreConservationist	229.665	227			
	FactorScoreEcocentric	218.903	227			

a R Squared = .001 (Adjusted R Squared = -.004)
b R Squared = .064 (Adjusted R Squared = .060)
c R Squared = .002 (Adjusted R Squared = -.002)

11.3.4.4.3 TV Frequency (Q2.25)

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreTechnocentric	2.942	3	.981	.972	.407
	FactorScoreAnthropocentric	9.781	3	3.260	3.383	.019
	FactorScoreConservationist	.618	3	.206	.204	.894
	FactorScoreEcocentric	3.510	3	1.170	1.154	.328
Intercept	FactorScoreTechnocentric	5.706E-04	1	5.706E-04	.001	.981
	FactorScoreAnthropocentric	1.605	1	1.605	1.665	.198
	FactorScoreConservationist	3.353E-04	1	3.353E-04	.000	.985
	FactorScoreEcocentric	.638	1	.638	.629	.429
Q2.25	FactorScoreTechnocentric	2.942	3	.981	.972	.407
	FactorScoreAnthropocentric	9.781	3	3.260	3.383	.019
	FactorScoreConservationist	.618	3	.206	.204	.894
	FactorScoreEcocentric	3.510	3	1.170	1.154	.328
Error	FactorScoreTechnocentric	206.847	205	1.009		
	FactorScoreAnthropocentric	197.584	205	.964		
	FactorScoreConservationist	207.018	205	1.010		
	FactorScoreEcocentric	207.824	205	1.014		
Total	FactorScoreTechnocentric	209.839	209			
	FactorScoreAnthropocentric	207.446	209			
	FactorScoreConservationist	207.682	209			
	FactorScoreEcocentric	211.672	209			
Corrected Total	FactorScoreTechnocentric	209.789	208			
	FactorScoreAnthropocentric	207.365	208			
	FactorScoreConservationist	207.635	208			
	FactorScoreEcocentric	211.334	208			

a R Squared = .014 (Adjusted R Squared = .000)
b R Squared = .047 (Adjusted R Squared = .033)
c R Squared = .003 (Adjusted R Squared = -.012)
d R Squared = .017 (Adjusted R Squared = .002)

11.3.4.5 Nature media and ecoemotionality

11.3.4.5.1 Read Books (Q2.23)

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreNatureSecure	5.251	3	1.750	1.761	.155
	FactorScoreNatureFearful	3.103	3	1.034	1.027	.381

	FactorScoreNatureDismissive	.431	3	.144	.143	.934
	FactorScoreNatureStoic	.769	3	.256	.254	.859
Intercept	FactorScoreNatureSecure	.510	1	.510	.513	.474
	FactorScoreNatureFearful	.657	1	.657	.652	.420
	FactorScoreNatureDismissive	.130	1	.130	.129	.719
	FactorScoreNatureStoic	1.751E-02	1	1.751E-02	.017	.895
Q2.23	FactorScoreNatureSecure	5.251	3	1.750	1.761	.155
	FactorScoreNatureFearful	3.103	3	1.034	1.027	.381
	FactorScoreNatureDismissive	.431	3	.144	.143	.934
	FactorScoreNatureStoic	.769	3	.256	.254	.859
Error	FactorScoreNatureSecure	247.534	249	.994		
	FactorScoreNatureFearful	250.855	249	1.007		
	FactorScoreNatureDismissive	249.599	249	1.002		
	FactorScoreNatureStoic	251.543	249	1.010		
Total	FactorScoreNatureSecure	252.805	253			
	FactorScoreNatureFearful	253.960	253			
	FactorScoreNatureDismissive	250.032	253			
	FactorScoreNatureStoic	252.328	253			
Corrected Total	FactorScoreNatureSecure	252.785	252			
	FactorScoreNatureFearful	253.957	252			
	FactorScoreNatureDismissive	250.030	252			
	FactorScoreNatureStoic	252.312	252			

a R Squared = .021 (Adjusted R Squared = .009)
b R Squared = .012 (Adjusted R Squared = .000)
c R Squared = .002 (Adjusted R Squared = -.010)
d R Squared = .003 (Adjusted R Squared = -.009)

11.3.4.5.2 TV (Q2.24)

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreNatureSecure	8.284E-02	1	8.284E-02	.083	.774
	FactorScoreNatureFearful	.736	1	.736	.738	.391
	FactorScoreNatureDismissive	13.431	1	13.431	14.204	.000
	FactorScoreNatureStoic	1.003E-02	1	1.003E-02	.010	.921
Intercept	FactorScoreNatureSecure	6.169E-02	1	6.169E-02	.061	.804
	FactorScoreNatureFearful	.150	1	.150	.151	.698
	FactorScoreNatureDismissive	2.630	1	2.630	2.782	.097
	FactorScoreNatureStoic	1.589E-02	1	1.589E-02	.016	.901
Q2.24	FactorScoreNatureSecure	8.284E-02	1	8.284E-02	.083	.774
	FactorScoreNatureFearful	.736	1	.736	.738	.391
	FactorScoreNatureDismissive	13.431	1	13.431	14.204	.000
	FactorScoreNatureStoic	1.003E-02	1	1.003E-02	.010	.921
Error	FactorScoreNatureSecure	251.845	251	1.003		
	FactorScoreNatureFearful	250.431	251	.998		
	FactorScoreNatureDismissive	237.333	251	.946		
	FactorScoreNatureStoic	256.578	251	1.022		

Total	FactorScoreNatureSecure	251.947	253
	FactorScoreNatureFearful	251.168	253
	FactorScoreNatureDismissive	250.764	253
	FactorScoreNatureStoic	256.597	253
Corrected Total	FactorScoreNatureSecure	251.928	252
	FactorScoreNatureFearful	251.167	252
	FactorScoreNatureDismissive	250.764	252
	FactorScoreNatureStoic	256.588	252

a R Squared = .000 (Adjusted R Squared = -.004)
b R Squared = .003 (Adjusted R Squared = -.001)
c R Squared = .054 (Adjusted R Squared = .050)

11.3.4.5.3 TV Frequency (Q2.25)

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreNatureSecure	8.542	3	2.847	2.921	.035
	FactorScoreNatureFearful	1.709	3	.570	.553	.647
	FactorScoreNatureDismissive	6.012	3	2.004	2.025	.111
	FactorScoreNatureStoic	3.515	3	1.172	1.179	.319
Intercept	FactorScoreNatureSecure	9.816E-02	1	9.816E-02	.101	.751
	FactorScoreNatureFearful	.175	1	.175	.169	.681
	FactorScoreNatureDismissive	.374	1	.374	.378	.539
	FactorScoreNatureStoic	.749	1	.749	.754	.386
Q2.25	FactorScoreNatureSecure	8.542	3	2.847	2.921	.035
	FactorScoreNatureFearful	1.709	3	.570	.553	.647
	FactorScoreNatureDismissive	6.012	3	2.004	2.025	.111
	FactorScoreNatureStoic	3.515	3	1.172	1.179	.319
Error	FactorScoreNatureSecure	218.324	224	.975		
	FactorScoreNatureFearful	230.942	224	1.031		
	FactorScoreNatureDismissive	221.643	224	.989		
	FactorScoreNatureStoic	222.575	224	.994		
Total	FactorScoreNatureSecure	227.192	228			
	FactorScoreNatureFearful	232.654	228			
	FactorScoreNatureDismissive	227.911	228			
	FactorScoreNatureStoic	226.089	228			
Corrected Total	FactorScoreNatureSecure	226.866	227			
	FactorScoreNatureFearful	232.652	227			
	FactorScoreNatureDismissive	227.655	227			
	FactorScoreNatureStoic	226.089	227			

a R Squared = .038 (Adjusted R Squared = .025)
b R Squared = .007 (Adjusted R Squared = -.006)
c R Squared = .026 (Adjusted R Squared = .013)
d R Squared = .016 (Adjusted R Squared = .002)

11.3.4.6 Nature media and relative sympathies

11.3.4.6.1 Read Books (Q2.23)

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreEnvirontSympathy	2.860	3	.953	.969	.408
	FactorScoreAnimalSympathy	3.768	3	1.256	1.244	.294
	FactorScoreHumanSympathy	3.520	3	1.173	1.199	.310
Intercept	FactorScoreEnvirontSympathy	3.136E-03	1	3.136E-03	.003	.955
	FactorScoreAnimalSympathy	1.037E-04	1	1.037E-04	.000	.992
	FactorScoreHumanSympathy	.607	1	.607	.620	.432
Q2.23	FactorScoreEnvirontSympathy	2.860	3	.953	.969	.408
	FactorScoreAnimalSympathy	3.768	3	1.256	1.244	.294
	FactorScoreHumanSympathy	3.520	3	1.173	1.199	.310
Error	FactorScoreEnvirontSympathy	271.519	276	.984		
	FactorScoreAnimalSympathy	278.580	276	1.009		
	FactorScoreHumanSympathy	270.068	276	.979		
Total	FactorScoreEnvirontSympathy	274.380	280			
	FactorScoreAnimalSympathy	282.396	280			
	FactorScoreHumanSympathy	273.589	280			
Corrected Total	FactorScoreEnvirontSympathy	274.380	279			
	FactorScoreAnimalSympathy	282.348	279			
	FactorScoreHumanSympathy	273.588	279			

a R Squared = .010 (Adjusted R Squared = .000)
b R Squared = .013 (Adjusted R Squared = .003)
c R Squared = .013 (Adjusted R Squared = .002)

11.3.4.6.2 TV (Q2.24)

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreEnvirontSympathy	2.345	1	2.345	2.365	.125
	FactorScoreAnimalSympathy	2.444	1	2.444	2.435	.120
	FactorScoreHumanSympathy	5.672E-02	1	5.672E-02	.056	.814
Intercept	FactorScoreEnvirontSympathy	.698	1	.698	.704	.402
	FactorScoreAnimalSympathy	.509	1	.509	.507	.477
	FactorScoreHumanSympathy	1.261E-02	1	1.261E-02	.012	.912
Q2.24	FactorScoreEnvirontSympathy	2.345	1	2.345	2.365	.125
	FactorScoreAnimalSympathy	2.444	1	2.444	2.435	.120
	FactorScoreHumanSympathy	5.672E-02	1	5.672E-02	.056	.814
Error	FactorScoreEnvirontSympathy	275.691	278	.992		
	FactorScoreAnimalSympathy	279.068	278	1.004		

	FactorScoreHumanSympathy	284.020	278	1.022
Total	FactorScoreEnvirontSympathy	278.064	280	
	FactorScoreAnimalSympathy	281.513	280	
	FactorScoreHumanSympathy	284.077	280	
Corrected Total	FactorScoreEnvirontSympathy	278.037	279	
	FactorScoreAnimalSympathy	281.512	279	
	FactorScoreHumanSympathy	284.077	279	

a R Squared = .008 (Adjusted R Squared = .005)
b R Squared = .009 (Adjusted R Squared = .005)
c R Squared = .000 (Adjusted R Squared = -.003)

11.3.4.6.3 TV Frequency (Q2.25)

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreEnvirontSympathy	2.441	3	.814	.785	.503
	FactorScoreAnimalSympathy	1.884	3	.628	.581	.628
	FactorScoreHumanSympathy	4.776	3	1.592	1.714	.165
Intercept	FactorScoreEnvirontSympathy	2.858E-02	1	2.858E-02	.028	.868
	FactorScoreAnimalSympathy	.117	1	.117	.109	.742
	FactorScoreHumanSympathy	2.692	1	2.692	2.899	.090
Q2.25	FactorScoreEnvirontSympathy	2.441	3	.814	.785	.503
	FactorScoreAnimalSympathy	1.884	3	.628	.581	.628
	FactorScoreHumanSympathy	4.776	3	1.592	1.714	.165
Error	FactorScoreEnvirontSympathy	260.188	251	1.037		
	FactorScoreAnimalSympathy	271.085	251	1.080		
	FactorScoreHumanSympathy	233.105	251	.929		
Total	FactorScoreEnvirontSympathy	262.926	255			
	FactorScoreAnimalSympathy	273.222	255			
	FactorScoreHumanSympathy	238.368	255			
Corrected Total	FactorScoreEnvirontSympathy	262.629	254			
	FactorScoreAnimalSympathy	272.969	254			
	FactorScoreHumanSympathy	237.882	254			

a R Squared = .009 (Adjusted R Squared = -.003)
b R Squared = .007 (Adjusted R Squared = -.005)
c R Squared = .020 (Adjusted R Squared = .008)

11.3.4.7 Nature child and ecoevaluation

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.

Corrected Model	FactorScoreTechnocentric	2.376	3	.792	.793	.499
	FactorScoreAnthropocentric	2.529	3	.843	.854	.466
	FactorScoreConservationist	2.041	3	.680	.673	.569
	FactorScoreEcocentric	2.046	3	.682	.699	.554
Intercept	FactorScoreTechnocentric	1.040	1	1.040	1.041	.309
	FactorScoreAnthropocentric	.538	1	.538	.545	.461
	FactorScoreConservationist	1.445	1	1.445	1.429	.233
	FactorScoreEcocentric	.420	1	.420	.431	.512
NTRKD123	FactorScoreTechnocentric	2.376	3	.792	.793	.499
	FactorScoreAnthropocentric	2.529	3	.843	.854	.466
	FactorScoreConservationist	2.041	3	.680	.673	.569
	FactorScoreEcocentric	2.046	3	.682	.699	.554
Error	FactorScoreTechnocentric	212.744	213	.999		
	FactorScoreAnthropocentric	210.339	213	.988		
	FactorScoreConservationist	215.309	213	1.011		
	FactorScoreEcocentric	207.909	213	.976		
Total	FactorScoreTechnocentric	215.120	217			
	FactorScoreAnthropocentric	212.906	217			
	FactorScoreConservationist	217.525	217			
	FactorScoreEcocentric	209.956	217			
Corrected Total	FactorScoreTechnocentric	215.120	216			
	FactorScoreAnthropocentric	212.868	216			
	FactorScoreConservationist	217.350	216			
	FactorScoreEcocentric	209.955	216			

a R Squared = .011 (Adjusted R Squared = -.003)
b R Squared = .012 (Adjusted R Squared = -.002)
c R Squared = .009 (Adjusted R Squared = -.005)
d R Squared = .010 (Adjusted R Squared = -.004)

11.3.4.8 Nature child and ecoemotionality

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreNatureSecure	9.012	3	3.004	3.136	.026
	FactorScoreNatureFearful	5.969	3	1.990	1.988	.116
	FactorScoreNatureDismissive	1.226	3	.409	.413	.744
	FactorScoreNatureStoic	3.549	3	1.183	1.149	.330
Intercept	FactorScoreNatureSecure	.191	1	.191	.199	.656
	FactorScoreNatureFearful	2.093	1	2.093	2.091	.149
	FactorScoreNatureDismissive	.889	1	.889	.899	.344
	FactorScoreNatureStoic	2.573	1	2.573	2.500	.115
NTRKD123	FactorScoreNatureSecure	9.012	3	3.004	3.136	.026
	FactorScoreNatureFearful	5.969	3	1.990	1.988	.116
	FactorScoreNatureDismissive	1.226	3	.409	.413	.744
	FactorScoreNatureStoic	3.549	3	1.183	1.149	.330
Error	FactorScoreNatureSecure	230.841	241	.958		

	FactorScoreNatureFearful	241.214	241	1.001
	FactorScoreNatureDismissive	238.377	241	.989
	FactorScoreNatureStoic	248.088	241	1.029
Total	FactorScoreNatureSecure	239.858	245	
	FactorScoreNatureFearful	247.206	245	
	FactorScoreNatureDismissive	239.707	245	
	FactorScoreNatureStoic	251.637	245	
Corrected Total	FactorScoreNatureSecure	239.854	244	
	FactorScoreNatureFearful	247.184	244	
	FactorScoreNatureDismissive	239.603	244	
	FactorScoreNatureStoic	251.636	244	

a R Squared = .038 (Adjusted R Squared = .026)
b R Squared = .024 (Adjusted R Squared = .012)
c R Squared = .005 (Adjusted R Squared = -.007)
d R Squared = .014 (Adjusted R Squared = .002)

11.3.4.9 Nature child and relative sympathies

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreEnvirontSympathy	6.721	3	2.240	2.322	.076
	FactorScoreAnimalSympathy	3.909	3	1.303	1.271	.285
	FactorScoreHumanSympathy	3.161	3	1.054	1.056	.368
Intercept	FactorScoreEnvirontSympathy	1.862	1	1.862	1.929	.166
	FactorScoreAnimalSympathy	.801	1	.801	.781	.378
	FactorScoreHumanSympathy	.754	1	.754	.756	.385
NTRKD123	FactorScoreEnvirontSympathy	6.721	3	2.240	2.322	.076
	FactorScoreAnimalSympathy	3.909	3	1.303	1.271	.285
	FactorScoreHumanSympathy	3.161	3	1.054	1.056	.368
Error	FactorScoreEnvirontSympathy	256.678	266	.965		
	FactorScoreAnimalSympathy	272.777	266	1.025		
	FactorScoreHumanSympathy	265.344	266	.998		
Total	FactorScoreEnvirontSympathy	263.433	270			
	FactorScoreAnimalSympathy	276.711	270			
	FactorScoreHumanSympathy	268.562	270			
Corrected Total	FactorScoreEnvirontSympathy	263.400	269			
	FactorScoreAnimalSympathy	276.686	269			
	FactorScoreHumanSympathy	268.504	269			

a R Squared = .026 (Adjusted R Squared = .015)
b R Squared = .014 (Adjusted R Squared = .003)
c R Squared = .012 (Adjusted R Squared = .001)

11.3.4.10 Pets and ecoevaluation

11.3.4.10.1 Pets (Q2.18)

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreTechnocentric	1.378E-02	1	1.378E-02	.014	.906
	FactorScoreAnthropocentric	2.522E-02	1	2.522E-02	.026	.873
	FactorScoreConservationist	.138	1	.138	.138	.711
	FactorScoreEcocentric	6.654	1	6.654	6.959	.009
Intercept	FactorScoreTechnocentric	2.907E-02	1	2.907E-02	.030	.863
	FactorScoreAnthropocentric	2.101E-02	1	2.101E-02	.021	.884
	FactorScoreConservationist	3.542E-03	1	3.542E-03	.004	.953
	FactorScoreEcocentric	3.234	1	3.234	3.382	.067
Q2.18	FactorScoreTechnocentric	1.378E-02	1	1.378E-02	.014	.906
	FactorScoreAnthropocentric	2.522E-02	1	2.522E-02	.026	.873
	FactorScoreConservationist	.138	1	.138	.138	.711
	FactorScoreEcocentric	6.654	1	6.654	6.959	.009
Error	FactorScoreTechnocentric	218.510	223	.980		
	FactorScoreAnthropocentric	220.096	223	.987		
	FactorScoreConservationist	223.240	223	1.001		
	FactorScoreEcocentric	213.245	223	.956		
Total	FactorScoreTechnocentric	218.539	225			
	FactorScoreAnthropocentric	220.123	225			
	FactorScoreConservationist	223.456	225			
	FactorScoreEcocentric	219.899	225			
Corrected Total	FactorScoreTechnocentric	218.523	224			
	FactorScoreAnthropocentric	220.121	224			
	FactorScoreConservationist	223.378	224			
	FactorScoreEcocentric	219.899	224			

a R Squared = .000 (Adjusted R Squared = -.004)
b R Squared = .001 (Adjusted R Squared = -.004)
c R Squared = .030 (Adjusted R Squared = .026)

11.3.4.10.2 Pet Types (Q2.19)

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreTechnocentric	2.065	4	.516	.512	.727
	FactorScoreAnthropocentric	2.534	4	.633	.629	.642
	FactorScoreConservationist	6.127	4	1.532	1.546	.190
	FactorScoreEcocentric	7.657	4	1.914	1.946	.104
Intercept	FactorScoreTechnocentric	5.489E-02	1	5.489E-02	.054	.816

	FactorScoreAnthropocentric	3.057E-03	1	3.057E-03	.003	.956
	FactorScoreConservationist	7.427E-02	1	7.427E-02	.075	.784
	FactorScoreEcocentric	8.270E-02	1	8.270E-02	.084	.772
Q2.19	FactorScoreTechnocentric	2.065	4	.516	.512	.727
	FactorScoreAnthropocentric	2.534	4	.633	.629	.642
	FactorScoreConservationist	6.127	4	1.532	1.546	.190
	FactorScoreEcocentric	7.657	4	1.914	1.946	.104
Error	FactorScoreTechnocentric	228.935	227	1.009		
	FactorScoreAnthropocentric	228.466	227	1.006		
	FactorScoreConservationist	224.873	227	.991		
	FactorScoreEcocentric	223.343	227	.984		
Total	FactorScoreTechnocentric	231.000	232			
	FactorScoreAnthropocentric	231.000	232			
	FactorScoreConservationist	231.000	232			
	FactorScoreEcocentric	231.000	232			
Corrected Total	FactorScoreTechnocentric	231.000	231			
	FactorScoreAnthropocentric	231.000	231			
	FactorScoreConservationist	231.000	231			
	FactorScoreEcocentric	231.000	231			

a R Squared = .009 (Adjusted R Squared = -.009)
b R Squared = .011 (Adjusted R Squared = -.006)
c R Squared = .027 (Adjusted R Squared = .009)
d R Squared = .033 (Adjusted R Squared = .016)

11.3.4.10.3 Mammal Types

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreTechnocentric	.228	3	7.586E-02	.075	.973
	FactorScoreAnthropocentric	2.954	3	.985	.984	.401
	FactorScoreConservationist	5.458	3	1.819	1.839	.141
	FactorScoreEcocentric	4.372	3	1.457	1.466	.225
Intercept	FactorScoreTechnocentric	7.630E-04	1	7.630E-04	.001	.978
	FactorScoreAnthropocentric	7.459E-02	1	7.459E-02	.075	.785
	FactorScoreConservationist	4.822E-03	1	4.822E-03	.005	.944
	FactorScoreEcocentric	.164	1	.164	.165	.685
MAMMALS	FactorScoreTechnocentric	.228	3	7.586E-02	.075	.973
	FactorScoreAnthropocentric	2.954	3	.985	.984	.401
	FactorScoreConservationist	5.458	3	1.819	1.839	.141
	FactorScoreEcocentric	4.372	3	1.457	1.466	.225
Error	FactorScoreTechnocentric	230.772	228	1.012		
	FactorScoreAnthropocentric	228.046	228	1.000		
	FactorScoreConservationist	225.542	228	.989		
	FactorScoreEcocentric	226.628	228	.994		
Total	FactorScoreTechnocentric	231.000	232			
	FactorScoreAnthropocentric	231.000	232			
	FactorScoreConservationist	231.000	232			

	FactorScoreEcocentric	231.000	232			
Corrected Total	FactorScoreTechnocentric	231.000	231			
	FactorScoreAnthropocentric	231.000	231			
	FactorScoreConservationist	231.000	231			
	FactorScoreEcocentric	231.000	231			

a R Squared = .001 (Adjusted R Squared = -.012)
b R Squared = .013 (Adjusted R Squared = .000)
c R Squared = .024 (Adjusted R Squared = .011)
d R Squared = .019 (Adjusted R Squared = .006)

11.3.4.10.4 Non-mammal Types

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreTechnocentric	3.667	3	1.222	1.226	.301
	FactorScoreAnthropocentric	3.413	3	1.138	1.140	.334
	FactorScoreConservationist	.413	3	.138	.136	.938
	FactorScoreEcocentric	1.760	3	.587	.584	.626
Intercept	FactorScoreTechnocentric	1.544	1	1.544	1.549	.215
	FactorScoreAnthropocentric	1.772	1	1.772	1.775	.184
	FactorScoreConservationist	4.644E-02	1	4.644E-02	.046	.831
	FactorScoreEcocentric	.170	1	.170	.169	.681
NONMAMML	FactorScoreTechnocentric	3.667	3	1.222	1.226	.301
	FactorScoreAnthropocentric	3.413	3	1.138	1.140	.334
	FactorScoreConservationist	.413	3	.138	.136	.938
	FactorScoreEcocentric	1.760	3	.587	.584	.626
Error	FactorScoreTechnocentric	227.333	228	.997		
	FactorScoreAnthropocentric	227.587	228	.998		
	FactorScoreConservationist	230.587	228	1.011		
	FactorScoreEcocentric	229.240	228	1.005		
Total	FactorScoreTechnocentric	231.000	232			
	FactorScoreAnthropocentric	231.000	232			
	FactorScoreConservationist	231.000	232			
	FactorScoreEcocentric	231.000	232			
Corrected Total	FactorScoreTechnocentric	231.000	231			
	FactorScoreAnthropocentric	231.000	231			
	FactorScoreConservationist	231.000	231			
	FactorScoreEcocentric	231.000	231			

a R Squared = .016 (Adjusted R Squared = .003)
b R Squared = .015 (Adjusted R Squared = .002)
c R Squared = .002 (Adjusted R Squared = -.011)
d R Squared = .008 (Adjusted R Squared = -.005)

11.3.4.11 Pets and ecoemotionality

11.3.4.11.1 Pets (Q2.18)

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreNatureSecure	2.432	1	2.432	2.471	.117
	FactorScoreNatureFearful	5.751E-02	1	5.751E-02	.057	.811
	FactorScoreNatureDismissive	.561	1	.561	.562	.454
	FactorScoreNatureStoic	4.471E-02	1	4.471E-02	.044	.835
Intercept	FactorScoreNatureSecure	1.640	1	1.640	1.667	.198
	FactorScoreNatureFearful	8.230E-02	1	8.230E-02	.082	.775
	FactorScoreNatureDismissive	.135	1	.135	.135	.713
	FactorScoreNatureStoic	3.935E-02	1	3.935E-02	.038	.845
Q2.18	FactorScoreNatureSecure	2.432	1	2.432	2.471	.117
	FactorScoreNatureFearful	5.751E-02	1	5.751E-02	.057	.811
	FactorScoreNatureDismissive	.561	1	.561	.562	.454
	FactorScoreNatureStoic	4.471E-02	1	4.471E-02	.044	.835
Error	FactorScoreNatureSecure	245.982	250	.984		
	FactorScoreNatureFearful	250.638	250	1.003		
	FactorScoreNatureDismissive	249.254	250	.997		
	FactorScoreNatureStoic	256.377	250	1.026		
Total	FactorScoreNatureSecure	248.463	252			
	FactorScoreNatureFearful	250.723	252			
	FactorScoreNatureDismissive	249.878	252			
	FactorScoreNatureStoic	256.426	252			
Corrected Total	FactorScoreNatureSecure	248.413	251			
	FactorScoreNatureFearful	250.696	251			
	FactorScoreNatureDismissive	249.815	251			
	FactorScoreNatureStoic	256.422	251			

a R Squared = .010 (Adjusted R Squared = .006)
b R Squared = .000 (Adjusted R Squared = -.004)
c R Squared = .002 (Adjusted R Squared = -.002)

11.3.4.11.2 Pet Types (Q2.19)

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreNatureSecure	2.673	4	.668	.665	.617
	FactorScoreNatureFearful	6.433	4	1.608	1.624	.169
	FactorScoreNatureDismissive	7.846	4	1.961	1.992	.096
	FactorScoreNatureStoic	1.187	4	.297	.293	.882
Intercept	FactorScoreNatureSecure	5.869E-02	1	5.869E-02	.058	.809

	FactorScoreNatureFearful	9.480E-02	1	9.480E-02	.096	.757
	FactorScoreNatureDismissive	.280	1	.280	.285	.594
	FactorScoreNatureStoic	9.911E-04	1	9.911E-04	.001	.975
Q2.19	FactorScoreNatureSecure	2.673	4	.668	.665	.617
	FactorScoreNatureFearful	6.433	4	1.608	1.624	.169
	FactorScoreNatureDismissive	7.846	4	1.961	1.992	.096
	FactorScoreNatureStoic	1.187	4	.297	.293	.882
Error	FactorScoreNatureSecure	255.327	254	1.005		
	FactorScoreNatureFearful	251.567	254	.990		
	FactorScoreNatureDismissive	250.154	254	.985		
	FactorScoreNatureStoic	256.813	254	1.011		
Total	FactorScoreNatureSecure	258.000	259			
	FactorScoreNatureFearful	258.000	259			
	FactorScoreNatureDismissive	258.000	259			
	FactorScoreNatureStoic	258.000	259			
Corrected Total	FactorScoreNatureSecure	258.000	258			
	FactorScoreNatureFearful	258.000	258			
	FactorScoreNatureDismissive	258.000	258			
	FactorScoreNatureStoic	258.000	258			

a R Squared = .010 (Adjusted R Squared = -.005)
b R Squared = .025 (Adjusted R Squared = .010)
c R Squared = .030 (Adjusted R Squared = .015)
d R Squared = .005 (Adjusted R Squared = -.011)

11.3.4.11.3 Mammal Types

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreNatureSecure	4.303	3	1.434	1.442	.231
	FactorScoreNatureFearful	8.331	3	2.777	2.836	.039
	FactorScoreNatureDismissive	1.159	3	.386	.384	.765
	FactorScoreNatureStoic	6.712	3	2.237	2.270	.081
Intercept	FactorScoreNatureSecure	.314	1	.314	.316	.575
	FactorScoreNatureFearful	.372	1	.372	.380	.538
	FactorScoreNatureDismissive	8.174E-02	1	8.174E-02	.081	.776
	FactorScoreNatureStoic	1.219E-02	1	1.219E-02	.012	.912
MAMMALS	FactorScoreNatureSecure	4.303	3	1.434	1.442	.231
	FactorScoreNatureFearful	8.331	3	2.777	2.836	.039
	FactorScoreNatureDismissive	1.159	3	.386	.384	.765
	FactorScoreNatureStoic	6.712	3	2.237	2.270	.081
Error	FactorScoreNatureSecure	253.697	255	.995		
	FactorScoreNatureFearful	249.669	255	.979		
	FactorScoreNatureDismissive	256.841	255	1.007		
	FactorScoreNatureStoic	251.288	255	.985		
Total	FactorScoreNatureSecure	258.000	259			
	FactorScoreNatureFearful	258.000	259			
	FactorScoreNatureDismissive	258.000	259			

	FactorScoreNatureStoic	258.000	259
Corrected Total	FactorScoreNatureSecure	258.000	258
	FactorScoreNatureFearful	258.000	258
	FactorScoreNatureDismissive	258.000	258
	FactorScoreNatureStoic	258.000	258

a R Squared = .017 (Adjusted R Squared = .005)
b R Squared = .032 (Adjusted R Squared = .021)
c R Squared = .004 (Adjusted R Squared = -.007)
d R Squared = .026 (Adjusted R Squared = .015)

11.3.4.11.4 Non-mammal Types

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreNatureSecure	3.286	3	1.095	1.096	.351
	FactorScoreNatureFearful	1.502	3	.501	.498	.684
	FactorScoreNatureDismissive	9.076	3	3.025	3.099	.027
	FactorScoreNatureStoic	.669	3	.223	.221	.882
Intercept	FactorScoreNatureSecure	1.466	1	1.466	1.468	.227
	FactorScoreNatureFearful	.178	1	.178	.177	.674
	FactorScoreNatureDismissive	2.576	1	2.576	2.639	.106
	FactorScoreNatureStoic	4.939E-03	1	4.939E-03	.005	.944
NONMAMML	FactorScoreNatureSecure	3.286	3	1.095	1.096	.351
	FactorScoreNatureFearful	1.502	3	.501	.498	.684
	FactorScoreNatureDismissive	9.076	3	3.025	3.099	.027
	FactorScoreNatureStoic	.669	3	.223	.221	.882
Error	FactorScoreNatureSecure	254.714	255	.999		
	FactorScoreNatureFearful	256.498	255	1.006		
	FactorScoreNatureDismissive	248.924	255	.976		
	FactorScoreNatureStoic	257.331	255	1.009		
Total	FactorScoreNatureSecure	258.000	259			
	FactorScoreNatureFearful	258.000	259			
	FactorScoreNatureDismissive	258.000	259			
	FactorScoreNatureStoic	258.000	259			
Corrected Total	FactorScoreNatureSecure	258.000	258			
	FactorScoreNatureFearful	258.000	258			
	FactorScoreNatureDismissive	258.000	258			
	FactorScoreNatureStoic	258.000	258			

a R Squared = .013 (Adjusted R Squared = .001)
b R Squared = .006 (Adjusted R Squared = -.006)
c R Squared = .035 (Adjusted R Squared = .024)
d R Squared = .003 (Adjusted R Squared = -.009)

11.3.4.12 Pets and relative sympathies

11.3.4.12.1 Pets (Q2.18)

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreEnvirontSympathy	.122	1	.122	.123	.726
	FactorScoreAnimalSympathy	5.029	1	5.029	5.036	.026
	FactorScoreHumanSympathy	4.902E-02	1	4.902E-02	.048	.826
Intercept	FactorScoreEnvirontSympathy	.201	1	.201	.201	.654
	FactorScoreAnimalSympathy	2.816	1	2.816	2.820	.094
	FactorScoreHumanSympathy	2.219E-02	1	2.219E-02	.022	.882
Q2.18	FactorScoreEnvirontSympathy	.122	1	.122	.123	.726
	FactorScoreAnimalSympathy	5.029	1	5.029	5.036	.026
	FactorScoreHumanSympathy	4.902E-02	1	4.902E-02	.048	.826
Error	FactorScoreEnvirontSympathy	275.308	276	.997		
	FactorScoreAnimalSympathy	275.630	276	.999		
	FactorScoreHumanSympathy	279.744	276	1.014		
Total	FactorScoreEnvirontSympathy	275.510	278			
	FactorScoreAnimalSympathy	280.662	278			
	FactorScoreHumanSympathy	279.793	278			
Corrected Total	FactorScoreEnvirontSympathy	275.430	277			
	FactorScoreAnimalSympathy	280.659	277			
	FactorScoreHumanSympathy	279.793	277			

a R Squared = .000 (Adjusted R Squared = -.003)
b R Squared = .018 (Adjusted R Squared = .014)

11.3.4.12.2 Pet Types (Q2.19)

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreEnvirontSympathy	5.716	4	1.429	1.438	.222
	FactorScoreAnimalSympathy	5.267	4	1.317	1.323	.262
	FactorScoreHumanSympathy	3.761	4	.940	.940	.441
Intercept	FactorScoreEnvirontSympathy	.227	1	.227	.228	.633
	FactorScoreAnimalSympathy	.130	1	.130	.130	.718
	FactorScoreHumanSympathy	2.863E-02	1	2.863E-02	.029	.866
Q2.19	FactorScoreEnvirontSympathy	5.716	4	1.429	1.438	.222
	FactorScoreAnimalSympathy	5.267	4	1.317	1.323	.262
	FactorScoreHumanSympathy	3.761	4	.940	.940	.441
Error	FactorScoreEnvirontSympathy	279.284	281	.994		
	FactorScoreAnimalSympathy	279.733	281	.995		
	FactorScoreHumanSympathy	281.239	281	1.001		

Total	FactorScoreEnvirontSympathy	285.000	286	
	FactorScoreAnimalSympathy	285.000	286	
	FactorScoreHumanSympathy	285.000	286	
Corrected Total	FactorScoreEnvirontSympathy	285.000	285	
	FactorScoreAnimalSympathy	285.000	285	
	FactorScoreHumanSympathy	285.000	285	

a R Squared = .020 (Adjusted R Squared = .006)
b R Squared = .018 (Adjusted R Squared = .005)
c R Squared = .013 (Adjusted R Squared = -.001)

11.3.4.12.3 Mammal Types

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreEnvirontSympathy	2.121	3	.707	.705	.550
	FactorScoreAnimalSympathy	7.104	3	2.368	2.403	.068
	FactorScoreHumanSympathy	3.611	3	1.204	1.206	.308
Intercept	FactorScoreEnvirontSympathy	3.608E-02	1	3.608E-02	.036	.850
	FactorScoreAnimalSympathy	3.327E-02	1	3.327E-02	.034	.854
	FactorScoreHumanSympathy	.245	1	.245	.245	.621
MAMMALS	FactorScoreEnvirontSympathy	2.121	3	.707	.705	.550
	FactorScoreAnimalSympathy	7.104	3	2.368	2.403	.068
	FactorScoreHumanSympathy	3.611	3	1.204	1.206	.308
Error	FactorScoreEnvirontSympathy	282.879	282	1.003		
	FactorScoreAnimalSympathy	277.896	282	.985		
	FactorScoreHumanSympathy	281.389	282	.998		
Total	FactorScoreEnvirontSympathy	285.000	286			
	FactorScoreAnimalSympathy	285.000	286			
	FactorScoreHumanSympathy	285.000	286			
Corrected Total	FactorScoreEnvirontSympathy	285.000	285			
	FactorScoreAnimalSympathy	285.000	285			
	FactorScoreHumanSympathy	285.000	285			

a R Squared = .007 (Adjusted R Squared = -.003)
b R Squared = .025 (Adjusted R Squared = .015)
c R Squared = .013 (Adjusted R Squared = .002)

11.3.4.12.4 Non-mammal Types

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreEnvirontSympathy	18.006	3	6.002	6.339	.000

	FactorScoreAnimalSympathy	2.376	3	.792	.790	.500
	FactorScoreHumanSympathy	.446	3	.149	.147	.931
Intercept	FactorScoreEnvirontSympathy	8.991	1	8.991	9.496	.002
	FactorScoreAnimalSympathy	.880	1	.880	.878	.349
	FactorScoreHumanSympathy	.147	1	.147	.146	.703
NONMAMML	FactorScoreEnvirontSympathy	18.006	3	6.002	6.339	.000
	FactorScoreAnimalSympathy	2.376	3	.792	.790	.500
	FactorScoreHumanSympathy	.446	3	.149	.147	.931
Error	FactorScoreEnvirontSympathy	266.994	282	.947		
	FactorScoreAnimalSympathy	282.624	282	1.002		
	FactorScoreHumanSympathy	284.554	282	1.009		
Total	FactorScoreEnvirontSympathy	285.000	286			
	FactorScoreAnimalSympathy	285.000	286			
	FactorScoreHumanSympathy	285.000	286			
Corrected Total	FactorScoreEnvirontSympathy	285.000	285			
	FactorScoreAnimalSympathy	285.000	285			
	FactorScoreHumanSympathy	285.000	285			

a R Squared = .063 (Adjusted R Squared = .053)
b R Squared = .008 (Adjusted R Squared = -.002)
c R Squared = .002 (Adjusted R Squared = -.009)

11.3.4.13 Menagerie and ecoevaluation

11.3.4.13.1 Menagerie Index

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreTechnocentric	8.365	7	1.195	1.187	.311
	FactorScoreAnthropocentric	4.968	7	.710	.712	.662
	FactorScoreConservationist	7.354	7	1.051	1.056	.393
	FactorScoreEcocentric	6.726	7	.961	.971	.453
Intercept	FactorScoreTechnocentric	.688	1	.688	.684	.409
	FactorScoreAnthropocentric	1.376E-02	1	1.376E-02	.014	.907
	FactorScoreConservationist	.248	1	.248	.249	.618
	FactorScoreEcocentric	2.374E-02	1	2.374E-02	.024	.877
MENAGERI	FactorScoreTechnocentric	8.365	7	1.195	1.187	.311
	FactorScoreAnthropocentric	4.968	7	.710	.712	.662
	FactorScoreConservationist	7.354	7	1.051	1.056	.393
	FactorScoreEcocentric	6.726	7	.961	.971	.453
Error	FactorScoreTechnocentric	221.401	220	1.006		
	FactorScoreAnthropocentric	219.178	220	.996		
	FactorScoreConservationist	218.877	220	.995		
	FactorScoreEcocentric	217.597	220	.989		
Total	FactorScoreTechnocentric	229.769	228			
	FactorScoreAnthropocentric	224.161	228			

	FactorScoreConservationist	226.276	228	
	FactorScoreEcocentric	224.323	228	
Corrected Total	FactorScoreTechnocentric	229.766	227	
	FactorScoreAnthropocentric	224.146	227	
	FactorScoreConservationist	226.231	227	
	FactorScoreEcocentric	224.322	227	

a R Squared = .036 (Adjusted R Squared = .006)
b R Squared = .022 (Adjusted R Squared = -.009)
c R Squared = .033 (Adjusted R Squared = .002)
d R Squared = .030 (Adjusted R Squared = -.001)

11.3.4.13.2 Siblings

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreTechnocentric	.387	4	9.685E-02	.094	.984
	FactorScoreAnthropocentric	12.563	4	3.141	3.310	.012
	FactorScoreConservationist	10.501	4	2.625	2.714	.031
	FactorScoreEcocentric	9.074	4	2.269	2.350	.055
Intercept	FactorScoreTechnocentric	3.962E-05	1	3.962E-05	.000	.995
	FactorScoreAnthropocentric	.499	1	.499	.526	.469
	FactorScoreConservationist	.132	1	.132	.136	.713
	FactorScoreEcocentric	5.414E-02	1	5.414E-02	.056	.813
SIBLINGS	FactorScoreTechnocentric	.387	4	9.685E-02	.094	.984
	FactorScoreAnthropocentric	12.563	4	3.141	3.310	.012
	FactorScoreConservationist	10.501	4	2.625	2.714	.031
	FactorScoreEcocentric	9.074	4	2.269	2.350	.055
Error	FactorScoreTechnocentric	229.379	223	1.029		
	FactorScoreAnthropocentric	211.583	223	.949		
	FactorScoreConservationist	215.731	223	.967		
	FactorScoreEcocentric	215.248	223	.965		
Total	FactorScoreTechnocentric	229.769	228			
	FactorScoreAnthropocentric	224.161	228			
	FactorScoreConservationist	226.276	228			
	FactorScoreEcocentric	224.323	228			
Corrected Total	FactorScoreTechnocentric	229.766	227			
	FactorScoreAnthropocentric	224.146	227			
	FactorScoreConservationist	226.231	227			
	FactorScoreEcocentric	224.322	227			

a R Squared = .002 (Adjusted R Squared = -.016)
b R Squared = .056 (Adjusted R Squared = .039)
c R Squared = .046 (Adjusted R Squared = .029)
d R Squared = .040 (Adjusted R Squared = .023)

11.3.4.14 Menagerie and ecoemotionality

11.3.4.14.1 Menagerie Index

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreNatureSecure	5.247	7	.750	.760	.621
	FactorScoreNatureFearful	3.883	7	.555	.562	.787
	FactorScoreNatureDismissive	6.957	7	.994	.999	.433
	FactorScoreNatureStoic	3.161	7	.452	.446	.872
Intercept	FactorScoreNatureSecure	.118	1	.118	.120	.729
	FactorScoreNatureFearful	.665	1	.665	.673	.413
	FactorScoreNatureDismissive	.397	1	.397	.399	.528
	FactorScoreNatureStoic	8.839E-02	1	8.839E-02	.087	.768
MENAGERI	FactorScoreNatureSecure	5.247	7	.750	.760	.621
	FactorScoreNatureFearful	3.883	7	.555	.562	.787
	FactorScoreNatureDismissive	6.957	7	.994	.999	.433
	FactorScoreNatureStoic	3.161	7	.452	.446	.872
Error	FactorScoreNatureSecure	243.544	247	.986		
	FactorScoreNatureFearful	244.027	247	.988		
	FactorScoreNatureDismissive	245.804	247	.995		
	FactorScoreNatureStoic	250.000	247	1.012		
Total	FactorScoreNatureSecure	248.793	255			
	FactorScoreNatureFearful	247.952	255			
	FactorScoreNatureDismissive	252.763	255			
	FactorScoreNatureStoic	253.179	255			
Corrected Total	FactorScoreNatureSecure	248.791	254			
	FactorScoreNatureFearful	247.911	254			
	FactorScoreNatureDismissive	252.761	254			
	FactorScoreNatureStoic	253.162	254			

a R Squared = .021 (Adjusted R Squared = -.007)
b R Squared = .016 (Adjusted R Squared = -.012)
c R Squared = .028 (Adjusted R Squared = .000)
d R Squared = .012 (Adjusted R Squared = -.015)

11.3.4.14.2 Siblings

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreNatureSecure	4.043	4	1.011	1.032	.391
	FactorScoreNatureFearful	5.155	4	1.289	1.327	.260
	FactorScoreNatureDismissive	6.822	4	1.705	1.734	.143
	FactorScoreNatureStoic	1.769	4	.442	.440	.780

Intercept	FactorScoreNatureSecure	.138	1	.138	.141	.708
	FactorScoreNatureFearful	.107	1	.107	.111	.740
	FactorScoreNatureDismissive	.355	1	.355	.361	.549
	FactorScoreNatureStoic	.133	1	.133	.133	.716
SIBLINGS	FactorScoreNatureSecure	4.043	4	1.011	1.032	.391
	FactorScoreNatureFearful	5.155	4	1.289	1.327	.260
	FactorScoreNatureDismissive	6.822	4	1.705	1.734	.143
	FactorScoreNatureStoic	1.769	4	.442	.440	.780
Error	FactorScoreNatureSecure	244.748	250	.979		
	FactorScoreNatureFearful	242.755	250	.971		
	FactorScoreNatureDismissive	245.939	250	.984		
	FactorScoreNatureStoic	251.393	250	1.006		
Total	FactorScoreNatureSecure	248.793	255			
	FactorScoreNatureFearful	247.952	255			
	FactorScoreNatureDismissive	252.763	255			
	FactorScoreNatureStoic	253.179	255			
Corrected Total	FactorScoreNatureSecure	248.791	254			
	FactorScoreNatureFearful	247.911	254			
	FactorScoreNatureDismissive	252.761	254			
	FactorScoreNatureStoic	253.162	254			

a R Squared = .016 (Adjusted R Squared = .001)
b R Squared = .021 (Adjusted R Squared = .005)
c R Squared = .027 (Adjusted R Squared = .011)
d R Squared = .007 (Adjusted R Squared = -.009)

11.3.4.15 Menagerie and relative sympathies

11.3.4.15.1 Menagerie Index

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreEnvirontSympathy	2.883	7	.412	.401	.901
	FactorScoreAnimalSympathy	8.819	7	1.260	1.254	.274
	FactorScoreHumanSympathy	8.049	7	1.150	1.171	.319
Intercept	FactorScoreEnvirontSympathy	8.422E-02	1	8.422E-02	.082	.775
	FactorScoreAnimalSympathy	.160	1	.160	.160	.690
	FactorScoreHumanSympathy	1.145	1	1.145	1.166	.281
MENAGERI	FactorScoreEnvirontSympathy	2.883	7	.412	.401	.901
	FactorScoreAnimalSympathy	8.819	7	1.260	1.254	.274
	FactorScoreHumanSympathy	8.049	7	1.150	1.171	.319
Error	FactorScoreEnvirontSympathy	281.420	274	1.027		
	FactorScoreAnimalSympathy	275.364	274	1.005		
	FactorScoreHumanSympathy	269.034	274	.982		
Total	FactorScoreEnvirontSympathy	284.306	282			
	FactorScoreAnimalSympathy	284.183	282			

	FactorScoreHumanSympathy	277.098	282	
Corrected Total	FactorScoreEnvirontSympathy	284.303	281	
	FactorScoreAnimalSympathy	284.183	281	
	FactorScoreHumanSympathy	277.083	281	

a R Squared = .010 (Adjusted R Squared = -.015)
b R Squared = .031 (Adjusted R Squared = .006)
c R Squared = .029 (Adjusted R Squared = .004)

11.3.4.15.2 Siblings

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreEnvirontSympathy	.620	4	.155	.151	.962
	FactorScoreAnimalSympathy	16.994	4	4.248	4.404	.002
	FactorScoreHumanSympathy	3.018	4	.755	.763	.550
Intercept	FactorScoreEnvirontSympathy	7.250E-04	1	7.250E-04	.001	.979
	FactorScoreAnimalSympathy	4.071E-03	1	4.071E-03	.004	.948
	FactorScoreHumanSympathy	8.789E-03	1	8.789E-03	.009	.925
SIBLINGS	FactorScoreEnvirontSympathy	.620	4	.155	.151	.962
	FactorScoreAnimalSympathy	16.994	4	4.248	4.404	.002
	FactorScoreHumanSympathy	3.018	4	.755	.763	.550
Error	FactorScoreEnvirontSympathy	283.683	277	1.024		
	FactorScoreAnimalSympathy	267.189	277	.965		
	FactorScoreHumanSympathy	274.065	277	.989		
Total	FactorScoreEnvirontSympathy	284.306	282			
	FactorScoreAnimalSympathy	284.183	282			
	FactorScoreHumanSympathy	277.098	282			
Corrected Total	FactorScoreEnvirontSympathy	284.303	281			
	FactorScoreAnimalSympathy	284.183	281			
	FactorScoreHumanSympathy	277.083	281			

a R Squared = .002 (Adjusted R Squared = -.012)
b R Squared = .060 (Adjusted R Squared = .046)
c R Squared = .011 (Adjusted R Squared = -.003)

11.3.4.16 Child movements and ecoevaluation

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreTechnocentric	5.209	3	1.736	1.734	.161
	FactorScoreAnthropocentric	13.058	3	4.353	4.528	.004
	FactorScoreConservationist	.559	3	.186	.186	.906
	FactorScoreEcocentric	2.599	3	.866	.872	.456

Intercept	FactorScoreTechnocentric	1.260	1	1.260	1.259	.263
	FactorScoreAnthropocentric	.655	1	.655	.681	.410
	FactorScoreConservationist	.300	1	.300	.299	.585
	FactorScoreEcocentric	6.853E-03	1	6.853E-03	.007	.934
RQ2.2	FactorScoreTechnocentric	5.209	3	1.736	1.734	.161
	FactorScoreAnthropocentric	13.058	3	4.353	4.528	.004
	FactorScoreConservationist	.559	3	.186	.186	.906
	FactorScoreEcocentric	2.599	3	.866	.872	.456
Error	FactorScoreTechnocentric	225.232	225	1.001		
	FactorScoreAnthropocentric	216.309	225	.961		
	FactorScoreConservationist	225.946	225	1.004		
	FactorScoreEcocentric	223.503	225	.993		
Total	FactorScoreTechnocentric	230.441	229			
	FactorScoreAnthropocentric	229.377	229			
	FactorScoreConservationist	226.549	229			
	FactorScoreEcocentric	226.102	229			
Corrected Total	FactorScoreTechnocentric	230.441	228			
	FactorScoreAnthropocentric	229.367	228			
	FactorScoreConservationist	226.505	228			
	FactorScoreEcocentric	226.102	228			

a R Squared = .023 (Adjusted R Squared = .010)
b R Squared = .057 (Adjusted R Squared = .044)
c R Squared = .002 (Adjusted R Squared = -.011)
d R Squared = .011 (Adjusted R Squared = -.002)

11.3.4.17 Child movements and ecoemotionality

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreNatureSecure	1.095	3	.365	.361	.781
	FactorScoreNatureFearful	6.741	3	2.247	2.256	.082
	FactorScoreNatureDismissive	14.034	3	4.678	4.843	.003
	FactorScoreNatureStoic	3.847	3	1.282	1.287	.279
Intercept	FactorScoreNatureSecure	3.044E-02	1	3.044E-02	.030	.862
	FactorScoreNatureFearful	1.590E-02	1	1.590E-02	.016	.900
	FactorScoreNatureDismissive	2.703	1	2.703	2.799	.096
	FactorScoreNatureStoic	.420	1	.420	.421	.517
RQ2.2	FactorScoreNatureSecure	1.095	3	.365	.361	.781
	FactorScoreNatureFearful	6.741	3	2.247	2.256	.082
	FactorScoreNatureDismissive	14.034	3	4.678	4.843	.003
	FactorScoreNatureStoic	3.847	3	1.282	1.287	.279
Error	FactorScoreNatureSecure	254.814	252	1.011		
	FactorScoreNatureFearful	250.960	252	.996		
	FactorScoreNatureDismissive	243.413	252	.966		
	FactorScoreNatureStoic	251.149	252	.997		
Total	FactorScoreNatureSecure	255.910	256			
	FactorScoreNatureFearful	257.701	256			

	FactorScoreNatureDismissive	257.447	256
	FactorScoreNatureStoic	255.001	256
Corrected Total	FactorScoreNatureSecure	255.910	255
	FactorScoreNatureFearful	257.701	255
	FactorScoreNatureDismissive	257.447	255
	FactorScoreNatureStoic	254.995	255

a R Squared = .004 (Adjusted R Squared = -.008)
b R Squared = .026 (Adjusted R Squared = .015)
c R Squared = .055 (Adjusted R Squared = .043)
d R Squared = .015 (Adjusted R Squared = .003)

11.3.4.18 Child movements and relative sympathies

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreEnvirontSympathy	7.693	3	2.564	2.584	.054
	FactorScoreAnimalSympathy	9.128	3	3.043	3.082	.028
	FactorScoreHumanSympathy	2.644	3	.881	.874	.455
Intercept	FactorScoreEnvirontSympathy	1.831	1	1.831	1.845	.175
	FactorScoreAnimalSympathy	.760	1	.760	.770	.381
	FactorScoreHumanSympathy	.156	1	.156	.155	.694
RQ2.2	FactorScoreEnvirontSympathy	7.693	3	2.564	2.584	.054
	FactorScoreAnimalSympathy	9.128	3	3.043	3.082	.028
	FactorScoreHumanSympathy	2.644	3	.881	.874	.455
Error	FactorScoreEnvirontSympathy	276.874	279	.992		
	FactorScoreAnimalSympathy	275.429	279	.987		
	FactorScoreHumanSympathy	281.311	279	1.008		
Total	FactorScoreEnvirontSympathy	284.569	283			
	FactorScoreAnimalSympathy	284.556	283			
	FactorScoreHumanSympathy	283.955	283			
Corrected Total	FactorScoreEnvirontSympathy	284.567	282			
	FactorScoreAnimalSympathy	284.556	282			
	FactorScoreHumanSympathy	283.955	282			

a R Squared = .027 (Adjusted R Squared = .017)
b R Squared = .032 (Adjusted R Squared = .022)
c R Squared = .009 (Adjusted R Squared = -.001)

11.3.4.19 Social class and ecoevaluation

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected	FactorScoreTechnocentric	11.177	6	1.863	1.907	.081

Model						
	FactorScoreAnthropocentric	4.812	6	.802	.798	.573
	FactorScoreConservationist	3.216	6	.536	.529	.786
	FactorScoreEcocentric	7.323	6	1.221	1.228	.293
Intercept	FactorScoreTechnocentric	1.556	1	1.556	1.593	.208
	FactorScoreAnthropocentric	.574	1	.574	.571	.451
	FactorScoreConservationist	9.484E-02	1	9.484E-02	.094	.760
	FactorScoreEcocentric	8.406E-03	1	8.406E-03	.008	.927
DADCLASS	FactorScoreTechnocentric	11.177	6	1.863	1.907	.081
	FactorScoreAnthropocentric	4.812	6	.802	.798	.573
	FactorScoreConservationist	3.216	6	.536	.529	.786
	FactorScoreEcocentric	7.323	6	1.221	1.228	.293
Error	FactorScoreTechnocentric	219.823	225	.977		
	FactorScoreAnthropocentric	226.188	225	1.005		
	FactorScoreConservationist	227.784	225	1.012		
	FactorScoreEcocentric	223.677	225	.994		
Total	FactorScoreTechnocentric	231.000	232			
	FactorScoreAnthropocentric	231.000	232			
	FactorScoreConservationist	231.000	232			
	FactorScoreEcocentric	231.000	232			
Corrected Total	FactorScoreTechnocentric	231.000	231			
	FactorScoreAnthropocentric	231.000	231			
	FactorScoreConservationist	231.000	231			
	FactorScoreEcocentric	231.000	231			

a R Squared = .048 (Adjusted R Squared = .023)
b R Squared = .021 (Adjusted R Squared = -.005)
c R Squared = .014 (Adjusted R Squared = -.012)
d R Squared = .032 (Adjusted R Squared = .006)

11.3.4.20 Social class and ecoemotionality

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreNatureSecure	10.502	6	1.750	1.782	.103
	FactorScoreNatureFearful	10.836	6	1.806	1.841	.092
	FactorScoreNatureDismissive	8.381	6	1.397	1.410	.211
	FactorScoreNatureStoic	3.802	6	.634	.628	.708
Intercept	FactorScoreNatureSecure	.438	1	.438	.446	.505
	FactorScoreNatureFearful	1.712	1	1.712	1.745	.188
	FactorScoreNatureDismissive	1.347	1	1.347	1.360	.245
	FactorScoreNatureStoic	.170	1	.170	.168	.682
DADCLASS	FactorScoreNatureSecure	10.502	6	1.750	1.782	.103
	FactorScoreNatureFearful	10.836	6	1.806	1.841	.092
	FactorScoreNatureDismissive	8.381	6	1.397	1.410	.211
	FactorScoreNatureStoic	3.802	6	.634	.628	.708
Error	FactorScoreNatureSecure	247.498	252	.982		
	FactorScoreNatureFearful	247.164	252	.981		

	FactorScoreNatureDismissive	249.619	252	.991
	FactorScoreNatureStoic	254.198	252	1.009
Total	FactorScoreNatureSecure	258.000	259	
	FactorScoreNatureFearful	258.000	259	
	FactorScoreNatureDismissive	258.000	259	
	FactorScoreNatureStoic	258.000	259	
Corrected Total	FactorScoreNatureSecure	258.000	258	
	FactorScoreNatureFearful	258.000	258	
	FactorScoreNatureDismissive	258.000	258	
	FactorScoreNatureStoic	258.000	258	

a R Squared = .041 (Adjusted R Squared = .018)
b R Squared = .042 (Adjusted R Squared = .019)
c R Squared = .032 (Adjusted R Squared = .009)
d R Squared = .015 (Adjusted R Squared = -.009)

11.3.4.21 Social class and relative sympathies

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreEnvirontSympathy	21.669	6	3.611	3.826	.001
	FactorScoreAnimalSympathy	16.426	6	2.738	2.844	.011
	FactorScoreHumanSympathy	4.948	6	.825	.822	.554
Intercept	FactorScoreEnvirontSympathy	.727	1	.727	.770	.381
	FactorScoreAnimalSympathy	5.462	1	5.462	5.674	.018
	FactorScoreHumanSympathy	.180	1	.180	.180	.672
DADCLASS	FactorScoreEnvirontSympathy	21.669	6	3.611	3.826	.001
	FactorScoreAnimalSympathy	16.426	6	2.738	2.844	.011
	FactorScoreHumanSympathy	4.948	6	.825	.822	.554
Error	FactorScoreEnvirontSympathy	263.331	279	.944		
	FactorScoreAnimalSympathy	268.574	279	.963		
	FactorScoreHumanSympathy	280.052	279	1.004		
Total	FactorScoreEnvirontSympathy	285.000	286			
	FactorScoreAnimalSympathy	285.000	286			
	FactorScoreHumanSympathy	285.000	286			
Corrected Total	FactorScoreEnvirontSympathy	285.000	285			
	FactorScoreAnimalSympathy	285.000	285			
	FactorScoreHumanSympathy	285.000	285			

a R Squared = .076 (Adjusted R Squared = .056)
b R Squared = .058 (Adjusted R Squared = .037)
c R Squared = .017 (Adjusted R Squared = -.004)

11.3.4.22 Education and ecoevaluation

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreTechnocentric	6.034	4	1.508	1.519	.198
	FactorScoreAnthropocentric	12.124	4	3.031	3.347	.011
	FactorScoreConservationist	7.347	4	1.837	1.880	.115
	FactorScoreEcocentric	1.402	4	.350	.338	.852
Intercept	FactorScoreTechnocentric	.915	1	.915	.922	.338
	FactorScoreAnthropocentric	1.621	1	1.621	1.790	.182
	FactorScoreConservationist	3.716	1	3.716	3.803	.052
	FactorScoreEcocentric	.261	1	.261	.252	.616
Q1.6	FactorScoreTechnocentric	6.034	4	1.508	1.519	.198
	FactorScoreAnthropocentric	12.124	4	3.031	3.347	.011
	FactorScoreConservationist	7.347	4	1.837	1.880	.115
	FactorScoreEcocentric	1.402	4	.350	.338	.852
Error	FactorScoreTechnocentric	216.535	218	.993		
	FactorScoreAnthropocentric	197.415	218	.906		
	FactorScoreConservationist	213.008	218	.977		
	FactorScoreEcocentric	225.933	218	1.036		
Total	FactorScoreTechnocentric	222.568	223			
	FactorScoreAnthropocentric	209.772	223			
	FactorScoreConservationist	220.637	223			
	FactorScoreEcocentric	227.354	223			
Corrected Total	FactorScoreTechnocentric	222.568	222			
	FactorScoreAnthropocentric	209.539	222			
	FactorScoreConservationist	220.356	222			
	FactorScoreEcocentric	227.335	222			

a R Squared = .027 (Adjusted R Squared = .009)
b R Squared = .058 (Adjusted R Squared = .041)
c R Squared = .033 (Adjusted R Squared = .016)
d R Squared = .006 (Adjusted R Squared = -.012)

11.3.4.23 Education and ecoemotionality

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreNatureSecure	2.203	4	.551	.538	.708
	FactorScoreNatureFearful	5.206	4	1.301	1.299	.271
	FactorScoreNatureDismissive	11.340	4	2.835	2.998	.019
	FactorScoreNatureStoic	6.215	4	1.554	1.574	.182
Intercept	FactorScoreNatureSecure	.593	1	.593	.580	.447
	FactorScoreNatureFearful	3.279E-03	1	3.279E-03	.003	.954
	FactorScoreNatureDismissive	2.679	1	2.679	2.833	.094
	FactorScoreNatureStoic	.153	1	.153	.155	.694
Q1.6	FactorScoreNatureSecure	2.203	4	.551	.538	.708
	FactorScoreNatureFearful	5.206	4	1.301	1.299	.271
	FactorScoreNatureDismissive	11.340	4	2.835	2.998	.019

	FactorScoreNatureStoic	6.215	4	1.554	1.574	.182
Error	FactorScoreNatureSecure	249.598	244	1.023		
	FactorScoreNatureFearful	244.457	244	1.002		
	FactorScoreNatureDismissive	230.764	244	.946		
	FactorScoreNatureStoic	240.786	244	.987		
Total	FactorScoreNatureSecure	251.819	249			
	FactorScoreNatureFearful	249.735	249			
	FactorScoreNatureDismissive	242.110	249			
	FactorScoreNatureStoic	247.144	249			
Corrected Total	FactorScoreNatureSecure	251.801	248			
	FactorScoreNatureFearful	249.663	248			
	FactorScoreNatureDismissive	242.104	248			
	FactorScoreNatureStoic	247.000	248			

a R Squared = .009 (Adjusted R Squared = -.008)
b R Squared = .021 (Adjusted R Squared = .005)
c R Squared = .047 (Adjusted R Squared = .031)
d R Squared = .025 (Adjusted R Squared = .009)

11.3.4.24 Education and relative sympathies

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreEnvirontSympathy	14.199	4	3.550	3.730	.006
	FactorScoreAnimalSympathy	5.554	4	1.388	1.369	.245
	FactorScoreHumanSympathy	14.491	4	3.623	3.788	.005
Intercept	FactorScoreEnvirontSympathy	4.957	1	4.957	5.209	.023
	FactorScoreAnimalSympathy	1.312	1	1.312	1.294	.256
	FactorScoreHumanSympathy	1.943	1	1.943	2.032	.155
Q1.6	FactorScoreEnvirontSympathy	14.199	4	3.550	3.730	.006
	FactorScoreAnimalSympathy	5.554	4	1.388	1.369	.245
	FactorScoreHumanSympathy	14.491	4	3.623	3.788	.005
Error	FactorScoreEnvirontSympathy	257.897	271	.952		
	FactorScoreAnimalSympathy	274.908	271	1.014		
	FactorScoreHumanSympathy	259.193	271	.956		
Total	FactorScoreEnvirontSympathy	272.158	276			
	FactorScoreAnimalSympathy	280.466	276			
	FactorScoreHumanSympathy	273.777	276			
Corrected Total	FactorScoreEnvirontSympathy	272.096	275			
	FactorScoreAnimalSympathy	280.462	275			
	FactorScoreHumanSympathy	273.683	275			

a R Squared = .052 (Adjusted R Squared = .038)
b R Squared = .020 (Adjusted R Squared = .005)
c R Squared = .053 (Adjusted R Squared = .039)

11.3.4.25 Adult home and ecoevaluation

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreTechnocentric	3.998	4	.999	.988	.415
	FactorScoreAnthropocentric	7.162	4	1.790	1.847	.121
	FactorScoreConservationist	10.075	4	2.519	2.573	.039
	FactorScoreEcocentric	2.500	4	.625	.620	.649
Intercept	FactorScoreTechnocentric	3.226E-03	1	3.226E-03	.003	.955
	FactorScoreAnthropocentric	.200	1	.200	.206	.650
	FactorScoreConservationist	8.910E-02	1	8.910E-02	.091	.763
	FactorScoreEcocentric	.135	1	.135	.134	.715
Q1.1	FactorScoreTechnocentric	3.998	4	.999	.988	.415
	FactorScoreAnthropocentric	7.162	4	1.790	1.847	.121
	FactorScoreConservationist	10.075	4	2.519	2.573	.039
	FactorScoreEcocentric	2.500	4	.625	.620	.649
Error	FactorScoreTechnocentric	226.668	224	1.012		
	FactorScoreAnthropocentric	217.113	224	.969		
	FactorScoreConservationist	219.296	224	.979		
	FactorScoreEcocentric	225.943	224	1.009		
Total	FactorScoreTechnocentric	230.666	229			
	FactorScoreAnthropocentric	224.285	229			
	FactorScoreConservationist	229.380	229			
	FactorScoreEcocentric	228.470	229			
Corrected Total	FactorScoreTechnocentric	230.665	228			
	FactorScoreAnthropocentric	224.275	228			
	FactorScoreConservationist	229.371	228			
	FactorScoreEcocentric	228.443	228			

a R Squared = .017 (Adjusted R Squared = .000)
b R Squared = .032 (Adjusted R Squared = .015)
c R Squared = .044 (Adjusted R Squared = .027)
d R Squared = .011 (Adjusted R Squared = -.007)

11.3.4.26 Adult home and ecoemotionality

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreNatureSecure	8.991	4	2.248	2.288	.060
	FactorScoreNatureFearful	23.634	4	5.908	6.389	.000
	FactorScoreNatureDismissive	20.807	4	5.202	5.596	.000
	FactorScoreNatureStoic	3.086	4	.772	.774	.543
Intercept	FactorScoreNatureSecure	2.445E-03	1	2.445E-03	.002	.960
	FactorScoreNatureFearful	1.593	1	1.593	1.723	.191
	FactorScoreNatureDismissive	.187	1	.187	.201	.654

	FactorScoreNatureStoic	.151	1	.151	.151	.698
Q1.1	FactorScoreNatureSecure	8.991	4	2.248	2.288	.060
	FactorScoreNatureFearful	23.634	4	5.908	6.389	.000
	FactorScoreNatureDismissive	20.807	4	5.202	5.596	.000
	FactorScoreNatureStoic	3.086	4	.772	.774	.543
Error	FactorScoreNatureSecure	246.550	251	.982		
	FactorScoreNatureFearful	232.131	251	.925		
	FactorScoreNatureDismissive	233.324	251	.930		
	FactorScoreNatureStoic	250.076	251	.996		
Total	FactorScoreNatureSecure	255.555	256			
	FactorScoreNatureFearful	255.765	256			
	FactorScoreNatureDismissive	254.132	256			
	FactorScoreNatureStoic	253.179	256			
Corrected Total	FactorScoreNatureSecure	255.542	255			
	FactorScoreNatureFearful	255.764	255			
	FactorScoreNatureDismissive	254.132	255			
	FactorScoreNatureStoic	253.162	255			

a R Squared = .035 (Adjusted R Squared = .020)
b R Squared = .092 (Adjusted R Squared = .078)
c R Squared = .082 (Adjusted R Squared = .067)
d R Squared = .012 (Adjusted R Squared = -.004)

11.3.4.27 Adult home and relative sympathies

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	FactorScoreEnvirontSympathy	21.073	4	5.268	5.560	.000
	FactorScoreAnimalSympathy	9.528	4	2.382	2.409	.050
	FactorScoreHumanSympathy	26.371	4	6.593	7.185	.000
Intercept	FactorScoreEnvirontSympathy	.366	1	.366	.387	.535
	FactorScoreAnimalSympathy	.668	1	.668	.675	.412
	FactorScoreHumanSympathy	1.152E-03	1	1.152E-03	.001	.972
Q1.1	FactorScoreEnvirontSympathy	21.073	4	5.268	5.560	.000
	FactorScoreAnimalSympathy	9.528	4	2.382	2.409	.050
	FactorScoreHumanSympathy	26.371	4	6.593	7.185	.000
Error	FactorScoreEnvirontSympathy	263.408	278	.948		
	FactorScoreAnimalSympathy	274.873	278	.989		
	FactorScoreHumanSympathy	255.074	278	.918		
Total	FactorScoreEnvirontSympathy	284.482	283			
	FactorScoreAnimalSympathy	284.404	283			
	FactorScoreHumanSympathy	281.445	283			
Corrected Total	FactorScoreEnvirontSympathy	284.481	282			
	FactorScoreAnimalSympathy	284.402	282			
	FactorScoreHumanSympathy	281.445	282			

a R Squared = .074 (Adjusted R Squared = .061)
b R Squared = .034 (Adjusted R Squared = .020)
c R Squared = .094 (Adjusted R Squared = .081)

11.4 List of files on accompanying CD-ROM

Full SPSS Output files for analyses carried out on all the principal elements of major and minor hypotheses are included on the accompanying CD-ROM. To view them, use a web browser to open the file entitled:

Index to SPSS Output files.htm

which lists all available files as hyperlinks. The contents of that file are as follows:

11.5 Index to SPSS Output files

Most important results for major hypotheses are listed in order of analysis in body of thesis. Results for lower order analyses including simple effects have been omitted.

Click on file title to open, use browser 'Back' button to return to Index.

Chapter 6.1

Paternal and maternal attachment versus ecoevaluation, ecoemotionality and relative sympathies

Chapter 6.2

Accessible nature versus ecoevaluation, ecomotionality and relative sympathies

Play versus ecoevaluation, ecoemotionality and relative sympathies

Wander versus ecoevaluation, ecoemotionality and relative sympathies

Favourite place versus ecoevaluation, ecoemotionality and relative sympathies

Chapter 6.3

Parental ecoactivity versus ecoevaluation, ecoemotionality and relative sympathies

Nature mentor versus ecoevaluation, ecoemotionality and relative sympathies

Ecoparenting versus ecoevaluation, ecoemotionality and relative sympathies

Chapter 7

Hobbies versus ecoevaluation, ecoemotionality and relative sympathies

Nature media versus ecoevaluation, ecoemotionality and relative sympathies

Nature child versus ecoevaluation, ecoemotionality and relative sympathies

Pets versus ecoevaluation, ecoemotionality and relative sympathies

Menagerie versus ecoevaluation, ecoemotionality and relative sympathies

Child movements versus ecoevaluation, ecoemotionality and relative sympathies

Social class versus ecoevaluation, ecoemotionality and relative sympathies

Education versus ecoevaluation, ecoemotionality and relative sympathies

Adult home versus ecoevaluation, ecoemotionality and relative sympathies

(End)

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