This is to certify that this thesis has been composed by and contains work done entirely by the author.

Naomi Elizabeth Holobow

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CHAPTER 1: INTRODUCTION

> What do you call a cat that has eight legs?
> An octopuss!
>
> (Greg, age 3;9[1])

Linguistic awareness, broadly defined, refers to the ability to treat language as an object. The study of linguistic awareness in children is proving to be a growing area of research amongst developmental psychologists and psycholinguists for reasons that will presently be made clear. The term **linguistic awareness** as it is used in this thesis refers to the same phenomenon that has been described elsewhere in the literature as **metalinguistic awareness** (a term coined by Cazden, 1974), **accessibility** (Klima, 1972), **linguistic intuitions** (Bever, 1970), **linguistic consciousness** (Ferguson and Slobin, 1973) and **language awareness** (Grieve, Tunmer & Pratt, 1980). The term **metalinguistic awareness** will be used only in reference to those investigations that set out to explore children's understanding of a metalinguistic vocabulary (their comprehension of such words as "letter", "word", "sentence" and the like). It will be shown that the

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[1] The "3;9" translates as three years and nine months. This format is used throughout the thesis whenever a child's age is described. The names of all the children who participated in the studies have been changed to protect the innocents.

innocuous riddle quoted at the beginning is in fact a **major** accomplishment, not only because it came from a child as young as three years of age, but also because it was offered spontaneously, and moreover, correctly, by the child. This accomplishment will be highlighted through a discussion of the theoretical issues, through a review of the relevant literature and also through an examination of the results of the experiments which were designed and conducted for this thesis.

Linguistic Awareness in Adults

Linguists have been pointing out for years that a speaker-hearer of a language not only produces and understands it, but also has intuitions about it. Indeed, judgements about the acceptability and interpretability of utterances, about the grammaticality of sentences, about synonymy and about ambiguity have served as the primary data base for many linguists in the tradition of generative grammar. Language description, in the form of The Standard Theory of generative syntax (Chomsky, 1965), and all the revisions and expansions that followed it, worked from these speaker reports. But these are not the only ways that adults demonstrate linguistic awareness.

Many forms of verbal humour reflect a conscious manipulation of language. For example, according to the incongruity and resolution theory of humour (Shultz,

1970; Suls, 1972), the riddle is a form of problem solving in which the greatest appreciation occurs when the incongruity of the answer has been resolved. The following riddle sets up incongruity through lexical ambiguity, the resolution of which depends on bringing into focus and contrasting the two meanings of the key word:

> Question: Why did the farmer name his hog Ink?
> Answer: Because he kept running out of the **pen.**
> (Shultz, 1974)

Recognizing a pun also demonstrates linguistic awareness. Slips of the tongue occasionally occur in the course of conversation, and when these slips are noticed by the speaker or the hearer, for a brief moment language itself becomes the focus of attention. A common tongue slip is the spoonerism ("You have hissed all my mystery lectures" - W. Spooner) where the articulatory program has reversed two segments. Slips may occur quite unconsciously, but the conscious appreciation that an error has been made is again an aspect of linguistic awareness. Adults engage in numerous other activities which involve the ability to treat language as an object: active word searching, either in speech or in solving crossword puzzles; detecting ambiguities in speech or print; translating from one language into another; questioning the etymology of a word; commenting on the speech of others and so on. All of these kinds of behaviour are manifestations of linguistic awareness, an ability that needs to be explained in its own right.

The Theoretical Framework

Research on the development of children's ability to reflect on language as an object is presently only in the embryonic stage. However, the potential theoretical gains to be made from the study of linguistic awareness in children have caused a number of researchers to involve themselves in a serious examination of the topic. A host of questions arises: Are there different levels of awareness? Must linguistic awareness be conscious? How does it relate to other kinds of awareness? What is its function? Is it a prerequisite to, or a result of other cognitive activities? Does linguistic awareness develop, and if so, does this coincide with any other aspects of development? What role, if any, does it play in the acquisition of language? It is with these last three questions in particular that the present thesis is most concerned.

Because research is only beginning to explore linguistic awareness within the framework of developmental psychology, we will show how this interest arose, by first examining some of the past and current theorizing on the relationship between linguistic and cognitive development.

The influence the work of Piaget has had on present research into child development cannot be overstated. The view that the **mentality** of the child differs qualitatively from that of the adult has

radically affected the course of developmental psychology, in producing a wealth of replications, innovations, critical commentaries and new theories.

Language acquisition research in the 1960s reflected both this notion of a qualitative difference (Piaget, 1926) and the then novel approach in linguistics towards a transformational generative grammar (Chomsky, 1957, 1965). In what has been called the decade of child syntax (Hakes, Evans and Tunmer, 1980), descriptive grammars of children's utterances were proposed, stemming largely from the examination of large quantities of speech samples produced by a very few children. The language of the child was viewed to be rule-governed and systematic, and the word classes and rules of combination that were described in these studies were based on independent analysis of child speech samples, and not simply transferred from adult grammar. Most of the work during this period dealt with children aged between eighteen months and four or five years. The lower end of this range characterized the beginning of a production of utterances with overt structure, while the upper end characterized what early researchers suggested was a structure of utterances approaching that of the adult. But the method of writing child grammars ran into theoretical difficulties.

As the answers to the question of <u>what</u> was learned by the child in terms of language changed, so too

did the notion of how it was learned. And since linguistic deep structure and transformational rules cannot be perceived in speech, the problem of accounting for the acquisition of grammar became more complex. The mid-sixties marked the revival of the continuing debate concerning **nativism** versus **empiricism** (Chomsky, 1965, 1966, 1974; Slobin, 1971; Smith and Miller, 1966). The issue was still present in the acquisition models and descriptions of processing strategies of the seventies (Bever, 1970, 1971; Ervin-Tripp, 1970; Slobin, 1973).

By the end of the sixties, linguistics itself was rapidly changing. Dissatisfaction with generative syntax was growing, as the problem of how to place semantics into the theory came to the forefront (Fillmore and Langendoen, 1971; Jacobs and Rosenbaum, 1968; Lyons, 1970). Developmental psycholinguists, too, became interested in fitting the development of semantic intent and meaning into a model of language acquisition. Thus research in the seventies was characterized by what was called a functional approach to child language. This approach in fact was not homogeneous, but was divided along two main lines. The grammar writers of the seventies were concerned with incorporating the functions of utterances into their models (Slobin, 1973 reviewed these studies), while other researchers were concerned with determining the function of language acquisition within the broader framework of developmental psychology. For the purposes of this thesis, it is this second

approach that we will examine more closely.

Cognitive Development

The functional approach stresses the role that experience plays in the language learning process. It involves a serious consideration of the development of other faculties, particularly social and cognitive. The most dominant theory integrating these three aspects of development was proposed by Piaget. Two aspects of the theory will briefly be considered here, for they are the ones that will best demonstrate the theoretical and experimental disagreement that has arisen, and will bring the discussion back to the topic of linguistic awareness. The first is that children's thought processes are qualitatively different from adults' (Piaget, 1928, 1952, 1967). The second is the notion that preschool children are egocentric - they cannot adopt the perspective of others (Piaget, 1926, 1955, 1974).

Piaget divided intellectual development into a series of qualitatively differing stages which all children must pass through: the sensori-motor period, the preoperational period, the concrete operational period and the period of formal operations. It is the preoperational stage that is of interest here.

Operations, as described by Piaget, are internalized **actions** that obey logical rules of organization. It is the development of these

operations that leads to "integrated and logical thought processes". Thus as the name implies, a preoperational child lacks the ability to think in a logical manner. This is why the child fails certain tasks, or at least, does not complete them in the way an older child or adult would. The tasks that Piaget devised to distinguish the preoperational child from the concrete operational child include tests of conservation, transitive inference, class inclusion and egocentrism.

In the mid-seventies, a large body of research emerged that seriously questioned Piaget's conclusion about the preschooler's lack of cognitive skills. Reviews of these studies (Cromer, 1976; Donaldson, 1976, 1978; Gelman, 1978) revealed that young children have and also use a range of intellectual skills. Recent research now shifts the emphasis away from what preschool children **cannot** do, to what they **can** do, under what conditions and in which contexts. It has been proposed that while young children possess certain intellectual abilities, they do not have the ability to exercise these skills in a wide range of contexts: the skills are not context-free but context-dependent (Donaldson, 1978). So the focus is on context - in which contexts are children likely to use their skills, and how do they differ from contexts where children fail to use their skills? What the child develops, in essence, is an ability to distinguish between contexts. To extend this to the study of language acquisition, it has been proposed that

children have the capacity to determine the intentions of a speaker, and that they use this "meaning" as a clue to cracking the linguistic code (Macnamara, 1972). Or, as Donaldson (1978) states:

> "The primary thing is now held to be the grasp of meaning - the ability to 'make sense' of things, and above all to make sense of what people do, which of course includes what people say. On this view, it is the child's ability to interpret situations which makes it possible for him, through active processes of hypothesis-testing and inference, to arrive at a knowledge of language." (page 38)

The weakest link in Piaget's theory of intellectual development lies with his treatment (both theoretical and empirical) of language acquisition. According to Piaget, language is just one kind of symbolic function, and cognition constrains language rather than language cognition (Piaget and Inhelder, 1969). Language is not the original source of thought - action is. In a paper that discusses language in terms of Piaget's theory, Elliot and Donaldson (1982) conclude:

> "It is therefore not the time to be as sanguine about children's understanding of language as Piaget appears to be. The studies we have reviewed point to the dangers of assuming that it is possible to direct the child's attention to an isolated feature of the total communicative act between himself and the adult. They therefore make it difficult to conclude, along with Piaget, that while both systems are developing, language follows behind cognition at a respectful distance." (page 165).

This weakness of not accounting for the importance of language is thus reflected in other aspects of Piaget's theory. Because cognitive structures are built up in individual transactions with the environment (Piaget, 1962), it would appear that the child's social world must

play an important role in intellectual (and also language) development. Indeed Piaget argued that social and intellectual developments are intimately related. However, his more recent writings did not attribute a clear causal role to social experience (Piaget and Inhelder, 1969). In light of this, we now come to the topic of egocentrism.

Social Development

Piaget's notion of egocentrism implied that preoperational children were unable to "put themselves in another person's shoes" so to speak. Children failed to appreciate any perspective but their own, and so were ineffective as communicators. Further, because of this cognitive inflexibility, the child was likewise thought to be unable to make deductive inferences of the sort of which the concrete operational child was capable (Piaget, 1955). Many researchers have now demonstrated that preoperational children can be shown to possess many intellectual abilities, included among which is the ability to adopt another point of view (Fishbein, Lewis and Keiffer, 1972; Hughes, 1975; Light, 1979; Masangkay, McFluskey, McIntyre, Simms-Knight, Vaughn and Flavell, 1974). Theoretically, what is at stake is the way the study of the child is approached, and here two main lines of reasoning can be contrasted: the "Piagetian" with the "Vygotskian". On the one hand, there is a centering on the individual - that is, the

child increasingly becomes aware of the (social) other and of the group, but initially is "egocentric through ignorance of his own subjectivity" (Piaget, 1950). On the other hand, there is a centering on the social - and children increasingly become aware of themselves as being separate from this social group (Mead, 1934; Vygotsky, 1962; Wallon, 1947):

> "the true direction of the development of thinking is not from the individual to the socialized, but from the social to the individual." (Vygotsky, 1962; page 20).

Paul Light (1979) points out that while Piaget

> "pays lip service to the idea that the development of reflective thought is an essentially social process, it is no longer clear how, if at all, social experience qualitatively affects that development." (page 14)

Light (1979) goes on to say that Mead (1934) defined the relationship explicitly; that social decentration was a necessary condition for intellectual decentration. Indeed, some social psychologists are now exploring experimentally the hypothesis that social interaction exercises a causal effect on cognitive development (Doise, 1980; Doise, Mugny and Perret-Clermont, 1975; Mugny and Doise, 1978; Wertsch, 1979).

We have already mentioned that research has shown that Piaget underestimated the ability of preoperational children to adopt another point of view. Research has also been conducted that has directly contrasted the Piagetian position of egocentrism with the Vygotskian position, by centering on the issue of the

social experience (Light, 1979). Research is now needed that will put language back into the picture, and in so doing will either show one of the positions to be empirically the more valid, or alternatively, will produce a new cohesive theory that will explain the interdependencies of language, cognition and social development. It is our contention that the study of linguistic awareness is the link that will allow these relationships to be defined. "Awareness" itself involves the ability to reflect on one's actions, and thus it involves "thought", which is, of course, what the study of cognitive development is all about. And because cognitive development is intertwined with social development, the study of linguistic awareness in young children will add valuable information to the study of child development.

Linguistic Awareness in Children

In line with the functionalist approach to language acquisition, if the child moves from context-dependent to context-free, or abstract thought, then we need to know what motivates this transition, how it takes place, and what the important factors are. Knowing what children are aware of will help to answer some of these questions.

Vygotsky (1962) argued that the control of thought processes (awareness) had a profound effect on

the cognitive development of the child :

> "it is precisely during early school age that the higher intellectual functions, whose main features are reflective awareness and deliberate control, come to the fore in the developmental process" (page 90)

and that it was language which played an important role in this development. In extending this view, Donaldson (1978) suggests that it is the development of this awareness that enables young children to exhibit and apply their skills in disembedded contexts. She further argues that the development of language awareness is largely responsible for the more general development of an awareness of thought processes.

Research has shown that children can spontaneously correct their own speech (Scollon, 1976), practise phonological sequences (Weir, 1962) and express an utterance in more than one way (Gleitman, Gleitman and Shipley, 1972; Slobin and Welsh, 1973). Children also develop at an early age social sets of rules that deal with "who says what to whom when" (de Stefano, 1971). This research did not, however, show that the children were **aware** of these language 'manipulations'. Data concerning what children are aware of in language will help uncover what their conception of language is (Clark, 1978).

Studies have been conducted that have examined a number of different aspects of linguistic awareness in children: **awareness of phonetic segmentation** (Bruce, 1964; Fox and Routh, 1975; Leopold, 1949; Marsh and

Mineo, 1977; Rosner and Simon, 1971; N.V. Smith, 1973; Wallach, Wallach, Dozier and Kaplan, 1977; Zhurova, 1973); **awareness of grammaticality and acceptability** (Bohannon, 1976; Carr, 1979; Gleitman, Gleitman and Shipley, 1972; Hakes, Evans and Tunmer, 1980; James and Miller, 1973; Pratt, Tunmer and Bowey, 1984; Scholl and Ryan, 1975; de Villiers and de Villiers, 1972); **awareness of communication** (Andersen, 1977; Bates, 1976; Patterson, Cosgrove and O'Brien, 1980; Robinson and Robinson, 1976, 1977, 1978); **awareness of synonymy** (Beilin, Lust, Sack and Natt, 1975; Hakes, Evans and Tunmer, 1980); **awareness of words** (Berthoud-Papandropoulou, 1978; Bowey and Tunmer, 1980; Downing, 1970; Ehri, 1975; Evans, Taylor and Blum, 1979; Hall, 1976; Holden and MacGinitie, 1972; Ianco-Worrall, 1972; Karpova, 1966; Kingston, Weaver and Figa, 1972; Osherson and Markman, 1975; Piaget, 1929; Tunmer, Bowey and Grieve, 1983; Vygotsky, 1962); and **awareness of ambiguity** (Bowes, 1979; Fowles and Glanz, 1977; Goldstein, 1976; Hirsh-Pasek, Gleitman and Gleitman, 1978; Kessel, 1970; Shultz and Pilon, 1973). These studies will be discussed in more detail later on. Generally speaking, the purposes of these studies are so varied that it is obvious that no coherent theory of linguistic awareness yet exists. The research methodologies are numerous, the data heterogeneous and the results contradictory. Nevertheless, reviewers seem to agree that there is considerable evidence to suggest

that children are aware of various aspects of language from an early age:

"From diary studies... as well as recent experiments, it has become clear that children reflect on language well before they receive any formal teaching in grammar: both spontaneously and in response to questions, they make remarks on pronunciation, on morphology, they correct other speakers, they remark on meaning and form, and they may even make puns". (Berthoud-Papandropoulou, 1978; page 55)

"Children begin to reflect on certain properties of language at an early age." (Clark, 1978; page 17)

"The following aspects of language awareness appear, between the ages of two and six (years): self-corrections... in on-going speech; comments on the speech of others; explicit questions about speech and language; comments on (the child's) own speech and language; response to direct questions about language." (Slobin, 1978; page 45)

There exists a great deal of controversy concerning the age of onset of linguistic awareness. As with the critical studies which have been conducted calling into question Piaget's theories about egocentrism and conservation, the issue of age is, for similar reasons, not trivial in the study of linguistic awareness. For example, following Vygotsky's (1962) and Donaldson's (1978) lines of reasoning (that language awareness plays an important role in the development of thought), the prediction is that linguistic awareness should emerge with (and also because of) the child's entrance into the school system - at about 5 to 6 years of age. There have been only a few investigations that have specifically examined linguistic awareness in relation to cognition; and amongst these few there has been little agreement as to the age of onset of

linguistic awareness. For example, Hakes, Evans and Tunmer (1980) started with a different theoretical perspective, and set out to test the hypothesis that the emergence of linguistic awareness is the linguistic manifestation of the emergence of concrete operational thought as it was defined by Piaget. Specifically, they proposed that linguistic awareness abilities were different from, and emerged later than the abilities used in the production and comprehension of language. The tasks that they employed to measure cognitive ability were conservation tasks. Thus they were predicting an increase in linguistic awareness abilities at about the age of 6 or 7. In fact this is precisely what they found: an increase in linguistic awareness that coincided with the development of cognitive abilities as they were measured by Piagetian conservation tasks.

Recently Bialystock and Ryan (1983) proposed a metacognitive model of language skills that viewed metalinguistic skills as ones that demand higher linguistic knowledge on a knowledge dimension, and higher cognitive control on a control dimension than do conversation skills. They also generally demand higher knowledge and control than do reading and writing skills, although these skills can overlap metalinguistic skills on the two dimensions. From this, we can predict that Bialystock and Ryan (1983) would hypothesize that linguistic awareness would not emerge before reading and writing skills, and thus would typically not emerge

before children entered the school system and received reading instruction (children would therefore be about 7 years of age).

To throw yet another prediction into the fray, Eson and Walmsley (1980) argued that the child's awareness of language should occur at around 10 to 12 years of age, because it is related to the development of 'semiformal' thought which exists prior to formal thinking in Piaget's formulation.

Different predictions have also been made in a couple of studies which have looked at how linguistic awareness relates to other aspects of language development. An interaction hypothesis has been advanced by Smith and Tager-Flusberg (1982), which states that the child's acquisition of language is influenced by the development of language awareness and, conversely, that the development of language awareness is influenced by linguistic development. Two assumptions underlie the interaction hypothesis:

> "a) that metalinguistic awareness serves an important role in preschool language acquisition as well as in later aspects of language development such as learning to read and
> b) that preschoolers as well as older children possess some metalinguistic abilities". (Smith and Tager-Flusberg, 1982; page 451)

This is similar to the theoretical argument put forth by Marshall and Morton (1978). They propose an "Ever More Maturing Adjunct" (EMMA) that monitors normal language processes, so that when a communication breakdown occurs,

EMMA analyses which part of the utterance should be revised, corrected or improved. Empirical support for the argument comes from Clark's (1978) and Slobin's (1978) anecdotal evidence which reports that even two- and three-year-old children actively monitor and spontaneously repair their own imperfect utterances.

It seems that the hypotheses underlying all of these predictions fall into two main camps - those that link linguistic awareness with cognitive development, and those that link linguistic awareness with language acquisition. In terms of the former, linguistic awareness skills have certain cognitive prerequisites, and so it is not until the cognitive skills have developed to a certain level that the linguistic awareness skills will appear. For some researchers (for example, Hakes, Evans and Tunmer, 1980) the cognitive prerequisite is concrete operational thought, while for others (such as Eson and Walmsley, 1980), it is semiformal operational thought. What is inherent in this line of thinking is that if children cannot demonstrate linguistic awareness skills until at least middle childhood, then preschool language acquisition cannot be influenced by the development of linguistic awareness.

The other side of the coin presents the view that the development of linguistic awareness interacts with language acquisition and thus certain behaviours that manifest linguistic awareness will be able to be

seen in young children just starting to produce and comprehend spoken language.

The difference of opinion concerning the age of onset of linguistic awareness reflects the basic difficulty of research into linguistic awareness at this point in time: an accurate definition and assessment of it does not yet exist.

Scope of the Present Research

The present research investigates linguistic awareness and development in young children. It sets out to test some specific hypotheses concerning the nature of the relation among the development of linguistic awareness, language acquisition, social sensitivity and cognition. Specifically, the focus is on words - the awareness of word order, the awareness of the phonologically arbitrary nature of the word and the awareness of the word as a unit of language. A series of experiments was designed to try and tap into children's possible judgemental skills, segmentation skills, analysis skills and explanation skills, all of which can be said to be behavioural manifestations of linguistic awareness. The experiments often pull together previously separate lines of inquiry - for example, the two homonym studies tap into both the awareness of words and the awareness of ambiguity as the experiments were designed to expose the arbitrary nature of the word.

Data were collected both longitudinally and cross-sectionally. The longitudinal study was a nine-month investigation of two-year-old English-speaking children living in Edinburgh. The children were visited in their homes for approximately one hour per session. The first two visits were separated by only a week, in order to verify that the measure of linguistic ability (the median number of syllables per utterance) calculated from the first session was accurate, and did not underestimate the abilities of the children due to such factors as shyness, time of day and the like. All other sessions occurred at monthly intervals, except for a four-month period during which time comparison data were collected from bilingual two-year-olds in Montreal (see Appendix A). Initially there were ten children under observation, but by the final session the number was down to seven. The longitudinal study was necessarily exploratory in nature because very few studies in the literature had tested children as young as two years of age. The literature, however, was the base from which questions and ideas were generated and which provided techniques that could be tested out on the two-year-olds. The various tasks which were given to the two-year-old children included two which tried to elicit judgements about grammaticality; one which tried to determine if the children could segment the spoken stream into discrete units - a "word block" game requiring the children to drop one block into a bucket for each word of

a given sentence; one which asked the children to construct a word from a given starting sound; one that asked class inclusion questions; one that noted children's responses to hearing a different language; and one that examined the children's notion of a word by asking them to put two words together to make a compound word. All of the sessions with the two-year-olds were audio recorded and later transcribed. Approximately fifty-five hours of tape recordings were collected.

The second way of collecting data was through systematic experimentation using slightly older children. Ideas for the experiments arose from both the observations of the two-year-old children and from studies in the literature. The subjects were nursery school children aged between approximately three and five years. We are grateful to the administrators of three of the nursery schools in Edinburgh and to the parents of the children attending these schools for allowing us to go in and play games with the children. All of the experiments were pilot-tested, usually, although not exclusively, with the children who attended the nursery school at the Department of Psychology of the University of Edinburgh.

Because research into linguistic awareness is so diverse, the background literature has not been reviewed in this introduction. Instead, the relevant research reviews occur at the beginning of the sections

to follow, as each section deals with a different aspect of linguistic awareness. Within each section, the organization consists of a critical review of the relevant research, followed by the two-year-old children's performances on some of the same tasks, followed in turn by a novel experimental investigation which was designed to address some of the issues and concerns that arose from the examination of previous research.

The first section to follow deals with the awareness of grammaticality. This is the area of linguistic awareness that has up to now generated the most research. Techniques abound that have attempted to elicit judgements (as behavioural manifestations of linguistic awareness) from children about the semantic and the syntactic acceptability of various sentence types. We applied two previously-used techniques to elicit judgements about word order in a replication attempt, using the ten two-year-old children. This was followed by an experiment that used a new procedure we developed to elicit judgements and explanations about the syntactic acceptability of sentences from nursery school-aged children. The second section deals with children's awareness of lexical ambiguity, which reflects the phonological arbitrariness of a word. The next section is an examination of children's awareness of the word as a unit of language. The results of the experiments are then brought together and discussed in accordance with

the theoretical framework in a concluding section.

The studies that follow set out to test some specific hypotheses that were motivated largely by the disparity between various theoretical viewpoints. Ultimately, we wanted to see if the diverse theorizing could be brought together, and to show that the views might not be at odds with one another, but could in fact be in accord with one another. For instance, while some researchers have proposed a relationship between linguistic awareness and cognition, and others between linguistic awareness and language development, we hypothesize that there will be a relation among cognitive development, language acquisition and linguistic awareness. The theoretical basis for this hypothesis stems from recent work being done on cognitive development which suggests that the intellectual skills of young children are not context-free, but context-dependent (Donaldson, 1978). One kind of intellectual skill is the ability to decentre, to take account of another person's perspective. Among others, Hughes (1975) has shown that given an appropriate task, preschool children can be shown to be not as egocentric as Piaget suggested. What such researchers are trying to do, is to determine in which contexts children are likely to use their skills. Given that the testing room situation is one of social interaction between an experimenter and a child, it seemed appropriate to look at the ability to decentre from a social cognitive

approach as well. Light (1979) devised a task of social sensitivity in a role-taking situation that can be said to bridge the gap between the social and individual aspects of cognition. Inherent in a task of this nature is a test of children's language comprehension and as such, it also provides an indication of linguistic development.

We propose that the link between social sensitivity and linguistic awareness is that both involve the ability to dissociate the actual from the hypothetical. In the case of role-taking, the link is the ability to treat oneself as an object; in linguistic awareness, it is the ability to treat language as an object. A similar argument has been proposed about language acquisition, in that as active participants in their linguistic environment, children must be sensitive to, hypothesize about and test language itself (Karmiloff-Smith, 1979; Macrae (Elliot), 1978). Our task was to devise situations or contexts that would allow children to use their language, their cognitive and their linguistic awareness skills. We hypothesized that it would be possible to do this.

Another hypothesis we propose is that the behavioural manifestations of linguistic awareness will develop gradually and will not appear in an all-or-none fashion. Because both language acquisition and cognitive development are no

longer viewed as all-or-none processes (Bruner, 1975; Gelman, 1978; Howe and Hillman, 1973; Trabasso, 1975), we supposed that the expression of linguistic awareness would similarly follow suit. Howe and Hillman (1973) in their research on the acquisition of semantic restrictions in children, found that although stimulus sentence types were relatively homogeneous, children's responses were neither 100 nor 0 percent correct within a sentence type. This led Howe and Hillman (1973) to state:

> "It must be recognized that while children may be acquiring one kind of restriction more rapidly than a second, neither is learned in an all-or-none fashion, and that the development of two or more may be occurring simultaneously." (page 138)

We have already discussed the studies that suggest the same hypothesis is valid for cognitive development.

The ultimate aim is to arrive at a working definition of linguistic awareness that will take into account the various theoretical and empirically-backed viewpoints.

CHAPTER 2: CHILDREN'S AWARENESS OF WORD ORDER

BACKGROUND RESEARCH

During the 1960s and early 1970s when the debate on linguistic competence and performance was strongly raging, an outlet emerged that proposed to bring together the linguistic and the psychological streams of language acquisition research. This was the notion of children's judgements - judgements about the acceptability and grammmaticality of sentences. It satisfied the linguists, because they would be able to apply the methods used in determining the competence of an adult native speaker: they could supplement the records of spontaneous speech with linguistic judgements and paraphrases. The child grammars that had been constructed were theoretically limiting because they were based on speech samples - and thus were in danger of not being able to move beyond being simple descriptions of language performance. The psychologists were intrigued because it could offer a more direct questioning technique which would help in characterizing the language behaviour of the young child. For example, the relative importance of semantics versus syntax in terms of how a child acquires a language could be more easily determined. It would help in determining the origins of and the relation between thought and language. Thus researchers set about trying to elicit

acceptability judgements from young children. Early on, it appeared that such judgements were not going to be easy to solicit. Brown and Bellugi (1964) were notoriously unsuccesssful in their attempt to ask a two-and-a-half-year-old "which is right, 'two shoes' or 'two shoe'?" The often-quoted response from the youngster was an exuberant "Pop goes the weasel!" Although it was probably unintentional, Brown and Bellugi (1964) had set the stage for failure - other researchers did not even bother to try to elicit linguistic judgements from children. One has only to read the introductions to many articles from that period to see that many researchers thought that obtaining such judgements was not possible. For example, C.S. Smith (1973) states:

> "One can't use these techniques with two- or three- year olds; children are notoriously unable or unwilling to give direct linguistic judgments or paraphrases of their own speech or the speech of others." (page 498)

Some researchers tried to devise experiments that would demonstrate, albeit in a more indirect fashion, that young children possessed some intuitions about the language they were acquiring. Others kept trying to refine techniques that could be used to ask young children whether or not they thought a given sentence was grammatical. A review of this work puts into perspective the experiments that follow, which attempted to show that young children could behaviourally manifest an awareness of word order.

Reversible and Nonreversible Sentences

Bever (1970), Slobin (1966) and Turner and Rommetveit (1967) all did work with children that concentrated on the imitation, production and/or comprehension of reversible and nonreversible passive and active sentences. This focus was not surprising, as the differences between the surface structures but not the deep structures of actives and passives were fundamentally important at that time within the theory of transformational-generative grammar proposed by Chomsky in 1957.

Slobin (1966) set up a reaction-time experiment whereby a picture was exposed to the subjects after the experimenter said a sentence. The task was to decide if the sentence was true or false with regard to the picture and to press the right-hand switch for a "true" response or the left-hand switch for a "false" response. Children between the ages of six and twelve years participated in the experiment. Slobin (1966) found that six-year-old children's responses to reversible passives such as "the boy is being pushed by the girl" were no better than chance although they responded appropriately to nonreversible passives such as "the flowers are being watered by the girl". The interpretation at the time was that with the nonreversible passives the children could rely on semantic information, but the reversible passives required syntactic analysis, which was apparently not

available to the children.

In a similar vein, Bever (1970) reported in his first experiment that children between the ages of two and three years performed (acted out sentences by using toy animals) almost randomly on reversible passive sentences, although they acted out simple active sentences 95 percent correctly. At this point, Bever (1970) was more positive in his conclusions than was Slobin (1966) - Bever attributed to the two-year-old child "at least a primitive notion of different sentence structures" (page 304). However, after performing a number of other experiments that varied the stimulus sentences in systematic ways, he found that children's performance on reversible active sentences ("the cow kisses the horse") steadily increased with age, but this was not the case with children's performance when acting out reversible passive sentences ("the horse is kissed by the cow"). With reversible passives there appeared to be an actual decrease in performance between the ages of 3;8 and 4;0 before a developmental increase (greater than fifty percent correct) occurred. Bever (1970) felt that this phase could be characterized by the overgeneralization of what he termed "Strategy D":

> "any Noun-Verb-Noun sequence within a potential internal unit in the surface structure corresponds to "actor-action-object"." (page 298)

Howe and Hillman (1973) took these studies a step further, in asking the children to **judge** the

acceptability of nonreversible sentences. Three types of sentences were constructed, in a correct and a reversed form: Animate Subject sentences ("the girl ate the cake" - "the cake ate the girl"), Animate Object sentences ("the fire warmed the cowboys" - "the cowboys warmed the fire") and Special Restriction sentences ("the soap cleaned the skirt" - "the skirt cleaned the soap").These were presented orally to the children for judgement. The ages of the children ranged between 4;6 and 9;8. Howe and Hillman (1973) found that even the youngest children were able to make correct judgements about the nonreversibility of the Animate Subject sentences (mean percent correct was 79.2), although there was a clear trend toward correct responses that increased with age. The other impressive finding, although the authors did not acknowledge it, was that the children were **willing and able** to make the judgements.

Semantically Anomalous and Non-anomalous Sentences

The notion of semantic acceptability was taken a step further in the research now to be described which focused on anomaly. James and Miller (1973) were interested in having children judge between semantically anomalous and meaningful sentences. Two groups of children (mean ages of 4;9 and 6;9 respectively) were asked to judge whether semantically anomalous sentences like "the furry girl smiled at the man" and meaningful sentences like "the pretty girl smiled at the man" were

silly or okay. Further, the children were asked to explain their judgements, and also to correct the semantically anomalous or silly ones. The semantically anomalous sentences were created by violating either an adjective-noun selection restriction rule or a subject-verb selection restriction rule. Within each of these types of violations the semantic features of ± animate and ± human were also violated. There was a significant age effect for the identification (judgement) task, whereby the older children performed better than the younger children.[2] Even at their worst, the proportion of correct judgements made by the four-year-olds was quite high - they judged a certain type (adjective-noun violation with the + human semantic feature violation) of anomalous sentence as silly 69 percent of the time.

That these youngsters not only attempted, but often succeeded at correctly fixing up the anomalous

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[2] This result is at variance with the interpretation of results stated by Tunmer and Grieve (1980) for the same experiment. They state "no developmental difference was observed between the 5- and 7-year-olds in the identification of sentences containing violations of the ± animate feature." This statement was probably made on the basis of the discussion section of James and Miller's (1973) paper, and not the results section. It can be seen from James and Miller's Figure 1 (page 73) that in only two instances out of eight of the ± animate feature sentences did the younger children perform as well as the older ones. That there existed no significant age x treatment interaction effect does not permit the interpretation of no developmental difference to be made: particularly in light of the fact that the main effect for age was significant (F (1,30) = 25.89, $p < .05$).

sentences was impressive. This positive result helped influence the methodology of most of the experiments included in this thesis - as much as was possible, children were asked to explain their responses.

Carr (1979), in a longitudinal study of children aged between two and five years, explored the developmental changes in children's judgements about the acceptability of anomalous and non-anomalous sentences. The semantically anomalous sentences consisted of three types: inanimate subject + animate predicate ("Can a plate wake up?"); animate subject + inanimate predicate ("Can a dog be tied in a parcel?"); and inanimate subject + inanimate predicate ("Can a biscuit be scribbled on?"). In one analysis, it was found that the percentage of correct judgements increased with age. However, when Carr (1979) looked at each child's responses longitudinally, she found a far more complex pattern - judgement capabilities could suddenly regress as well as progress. The obtained pattern of results was interpreted in terms of an experience-based verification strategy, whereby in order to make a semantic judgement, children relate the meaning of a sentence to their own personal experiences and decide on that basis whether the sentence's content is verified or unverified in experience:

> "The child's personal experience, for example whether there was a pet cat or dog at home, also influenced judgements. A child with a pet cat might agree that a cat could sleep, but assert that a dog could not." (page 237)

This is in line with the conclusions drawn by Donaldson and McGarrigle (1974) in describing the semantic development of children - they felt that nonlinguistic rules were as important as the lexical and syntactic rules when young children assigned truth-values to statements.

Grammatical and Ungrammatical Sentences

In the early 1960s there was work going on within the transformational-generative model of grammar that had a different focus. Instead of eliciting judgements about the semantic acceptability of various grammatical though possibly unacceptable sentences, some researchers concentrated on contrasting grammatical with ungrammatical sentences. Menyuk (1963) had children aged 2;10 to 6;0 participate in a sentence-repetition task. The stimulus sentences (58 in all) were representative of the various transformation types and restricted forms found in children's grammar, and ranged from question exemplars ("Are you nice?") to noun form omission ("I have two tooth") to double negation ("You can't put no more water in it"). The hypothesis was that if told to repeat an ungrammatical string, younger children would modify the string in accordance with the rules of their grammar, whereas the older children would be able to repeat it verbatim. This hypothesis was in fact supported and the conclusion drawn that children as young

as three years of age had incorporated most of the basic generative rules of grammar and that the children used these rules in their comprehension and production of sentences. What was addresed only circuitously, however, was the fact that the younger children did not seem to be **aware** of the modifications they produced.

C.S. Smith (1973) had 3- to 4- year- old children repeat stimulus sentences that varied as to type (A or B) and also grammaticalness, but that had similar surface structures. Type A sentences included the aspects of conjunction, complement and number while type B sentences contained adjectives, relative clauses, verb auxiliaries and conjunction inversions. Her hypothesis was that the children would find it relatively difficult to repeat the ungrammatical sentences. This turned out to be supported - the children were accurate only 33 percent of the time in repeating ungrammatical stimuli of type B that, interestingly, did not occur in their own spontaneous speech (in grammatical or ungrammatical form). These types included adjectives ("They played with long yellow blocks"), relative clauses ("The lady who sneezes is sick"), verb auxiliaries ("Daddy may have missed the train") and conjunction inversions ("Not George but Danny came along"). Further, for sentences of type A that <u>were</u> present in the children's spontaneous speech (number, object complement and conjunction), when errors of repetition occurred (40 percent of the time), they were in the direction of grammaticalness in that the

children tended to "fix up" an ungrammatical string into a grammatical one:

"(Stimulus): **Mine** old green coat has holes.
(Response): **My** old green coat has holes."

This comes as no surprise, as Menyuk (1963) found that children as young as three years of age tended to correct ungrammatical strings. C.S. Smith (1973) fortunately went further, and extended her analysis by examining the response differences that occurred to different sentence structures because responses to types that were not in the children's spontaneous speech were not necessarily correction attempts. In fact, the children could only correctly repeat the grammatical forms of these structures 60 percent of the time. Smith proposed three classifications that incorporated and explained the varied responses: 1. for structures that were present in spontaneous speech, the grammatical sentences were repeated verbatim and the ungrammatical ones corrected; 2. for structures that did not occur in spontaneous speech, the grammatical sentences were seldom repeated accurately and the ungrammatical ones very rarely corrected or repeated; and 3. for structures that were not present in spontaneous speech but within the competence of the children, there were quite a few accurate repetitions of grammatical sentences and sometimes corrections were made to the ungrammatical strings. C.S. Smith (1973) felt that these classifications reflected different levels of competence.

Shipley, Smith and Gleitman (1969) found that children two years of age at the telegraphic stage of language acquistion responded to commands more frequently when the commands were presented as well-formed utterances ("throw me the ball") than when the commands were presented in the child's own telegraphic style ("throw ball"). It appeared to them that what the child brings to the learning situation is knowledge about language:

> "we suspect that the child comes equipped with a set of capacities, and also incapacities, which assure that he will respond selectively to the linguistic environment." (page 338)

Wetstone and Friedlander (1973) worked from the assumption that even relatively fluent children as old as five and six years respond to language by means of the semantic effectiveness of individual words rather than by means of the underlying syntactic relationships (Hornby, Hass and Feldman, 1970). They hypothesized that for younger children (two-year-olds), if word order carried communication value, then a distortion of this word order would disrupt communication. Using a scoring procedure of relevant versus nonrelevant responses (a response would be scored as relevant if the child jumped after hearing the sentence "You how jump me show", for example), Wetstone and Friedlander (1973) were surprised to find that the children with the highest mean length of utterances gave more nonrelevant responses (their scores were significantly lower) than children who were classed

as holophrastic. The work done with two-year-olds to be described in this thesis demonstrates that the only surprise is with what Wetstone and Friedlander considered to be "relevant" and "nonrelevant" responses. Our feeling is that a more relevant response to a sentence like "You how jump me show" is "a marked display of puzzlement", which is what Wetstone and Friedlander (1973) classed as nonrelevant. We would contend that those children whose behaviours were classed as nonrelevant were in fact demonstrating linguistic awareness.

More recently, judgements have been elicited from children as young as three years of age as to whether they thought puppets saying sentences containing grammatical and ungrammatical irregular past tense verb forms sounded "silly" or "okay". Kuczaj (1978) found that all the children tested (whose ages ranged from 3;4 to 8;6) consistently judged the grammatical forms to be okay. However, the youngest children judged the ungrammatical verb form of **base + ed** (for example, "eated") to be okay 77 percent of the time, whereas the oldest children judged them as okay only 19 percent of the time. Thus a developmental trend towards correct judgements of ungrammatical strings was observed. It must be noted, though, that in pre-experimental testing, any children who could not or would not do the task were eliminated from further testing. The pre-test involved having the children judge grammatical ("I like to eat

beans") and ungrammatical ("believe green eat daisy bear") strings. Only children who **could** judge correctly (the criterion was four sentences in succession) participated in the actual experiment. It would be interesting to know how many children had to be eliminated on the basis of pre-testing.

The paper that had the most impact on the psychological community was that of Gleitman, Gleitman and Shipley (1972). They devised an ingenious role-modelling game to help elicit judgements of grammaticality from very young children. Using simple imperative sentences, they found that three girls, aged between 26 and 30 months, could say whether they thought the sentences presented to them were "good" or "silly". The mother was first asked to judge as good or silly a list of thirty simple imperative sentences which the experimenter read to her. She was also asked to repeat the good sentences verbatim and to "fix up" the silly ones. The noun-verb order of the sentences was either correct or reversed ("Find the cup" and "Cup the find"), and the imperatives were either telegraphic or well-formed ("Shut door" and "Shut the door"). The opportunity to judge the sentences was then given to the child, with the mother presenting the sentences. All three children made judgements of the sentences, but not necessarily the correct ones. For the ungrammatical strings, the reversed order telegraphic sentences were judged as good 58 percent of the time by all the

children. The normal order telegraphic strings were more likely to be judged as good rather than silly (100%, 82% and 58% for each of the three children respectively). The reversed order full-sentence imperatives were also more likely to be judged as good rather than silly (75%, 50% and 58% respectively). As concerns the grammatical normal order sentences, the percentages of sentences judged to be good were much higher (92%, 80% and 80%). When judgements of normal order sentences (well-formed and telegraphic sentences combined) were compared with judgements of reversed order sentences, the strongest positive result emerged: the children were significantly more likely to judge reversed order sentences as silly. The authors felt that the fact that the children were willing to make any judgements at all indicated that they could view language as an object.

De Villiers and de Villiers (1972) took exception to this conclusion. They felt that the most important data should not be the judgements alone, but the corrections offered by the children. And since only two of the children in the Gleitman et al. (1972) experiment attempted any corrections at all, they felt that there was insufficient data to make any claims about the basis of the child's grammatical judgements. Rather, they felt that semantic factors could be playing a large role, as of the nineteen corrections given, sixteen of them changed meaning rather than just word order. For example, "Iron up the pick" was changed to "Iron the

clothes". With this change of focus then, de Villiers and de Villiers (1972) made a number of modifications to the Gleitman et al. (1972) procedure. They included not only correct and reversed word order imperatives, but (a week later) also semantically anomalous ones like "Drink the chair" and "Throw the sky" in their stimulus sentence lists. Instead of adopting the role-modelling technique, de Villiers and de Villiers (1972) used two hand puppets, one of which was held by the experimenter, and who said things "all the wrong way round". The other puppet, subsequently held by the child, was the teacher puppet. The teacher puppet had to judge whether the sentence the other puppet said was "right" or "wrong". Further, if a sentence was judged to be wrong, the teacher puppet was asked what the "right way to say it" was. De Villiers and de Villiers (1972) found that the least advanced children (according to mean length of utterance) were unable to discriminate between the reversed and correct sentences, and that their behaviour suggested that they were looking at the meaning of the imperative, rather than the structure of it. These children rejected the nonsense sentences, but they did not offer any corrections. The authors were particularly interested in the finding that correct judgements of semantic anomaly could be elicited from the very children who were unable to make correct judgements about word order. Only the more linguistically advanced children were able to make a significant number of correct judgements of reversed word

order strings. From these results, de Villiers and de Villiers concluded that semantic factors were more important than syntactic factors in children's judgements of the acceptability of sentences.

Scholl and Ryan (1975) felt that a nonverbal choice response with two alternatives would be a more appropriate procedure than having children respond by saying "good" or "silly" (as in the Gleitman, Gleitman and Shipley, 1972 procedure), or "right" or "wrong" (as in the De Villiers and de Villiers, 1972 experiment) which they felt were words that could well be semantically misunderstood by the children. To this end, after the children had heard a stimulus sentence, they had to decide if the talk "belonged" to an adult (and point to the picture of the mother) or if it belonged to a child (in which case they had to point to the picture of the two-year-old girl). The test sentences were of two types - negatives and wh-word questions. Within each type, sentences varied as to grammatical complexity, from primitive ("Not we go home"), to more complex ("We not go home") to well-formed ("We can not go home"). There were two groups of children who participated in this study. One group was composed of children in kindergarten (mean age was 5;7) and the other of children in grade 2 (mean age was 7;8). Scholl and Ryan (1975) found that for the wh-word questions, there was no age effect. Both groups of children pointed to the mother more frequently as the grammatical complexity of the sentence increased. They

did find an age difference, though, in the responses to the negative sentences. The older children pointed to the mother for more of the well-formed sentences than did the younger children. In addition, the younger children attributed more ungrammatical primitive negative sentences to the adult than was expected. However, Scholl and Ryan (1975) concluded that their technique was successful and that five- and seven-year olds demonstrate the ability to distinguish grammatically well-formed from primitive sentences.

Bohannon (1975) employed the use of two small dolls in a syntax discrimination task. One doll talked "pretty silly" but the other said things well. After hearing a "message", the children (first, second and fifth graders) had to point to the doll who would have said it. The results demonstrated that only 40 percent of first grade children (mean age of 6;9) could discriminate between normal and scrambled syntax, 75 percent of second-graders could learn the discrimination task with five errors or less and 95 percent of the fifth grade children could discriminate.

In 1976, Bohannon extended the task, and examined the relationships between the ability to discriminate between normal and random syntax and the ability to imitate and comprehend both sentence constructions. This time he included children in kindergarten (mean age of 5;9) in addition to first and

second graders. The stimulus sentences in the discrimination task had either normal syntax ("Mother told you to wash your hands") or random syntax ("Told mother you hands to your wash"). Bohannon (1976) found that only 22 percent of the kindergarten children could discriminate, which was in line with his 1975 trend of results that showed an increasing ability to discriminate as age increased. About the same percentage of second graders as in the first experiment were shown to be discriminators (78 percent). The innovation was that Bohannon (1976) linked the ability to discriminate between scrambled and grammatically correct sentences with the ability to both imitate and comprehend normal sentences - the children who were classed as discriminators were superior to the nondiscriminators in both imitating and comprehending the grammatically correct sentences, regardless of age.

Ryan and Ledger (1979) hypothesized that perhaps the poor performance of children in kindergarten could be improved with training. In their second experiment they adapted the Bohannon (1975) procedure of having the children point to one of two dolls, and trained one group of kindergarten children (mean age was 6;0) to judge grammatical and ungrammatical sentences through a series of six sessions with constant feedback. Children in the control group obviously did not participate in the training sessions. Post-test results indicated that the accuracy of grammaticality judgements

could not be enhanced by training procedures - there was no significant difference on judgement scores between the experimental and control groups. Ryan and Ledger (1979) concluded:

> "this study clearly demonstrates that kindergarten children are not easily brought to shift their attention to sentence structure." (page 35)

Recently, one of the studies done by Hakes, Evans and Tunmer (1980) modified the de Villiers and de Villiers' (1972) procedure for eliciting acceptability judgements. (In point of fact, the procedure used more closely resembled that of Donaldson and Lloyd's (1974) "talking panda" technique, except that in the Hakes et al. task, the voice came from the experimenter rather than from inside the toy.) A purple elephant toy was introduced to the child as an elephant with a problem - he sometimes said things "the wrong way round". The child was asked to give a judgement of right or wrong and to explain and correct the sentences judged as wrong. The children tested ranged in age from 4 to 8 years. The results showed that children aged five years and older were almost entirely accurate in judging the reversed word order sentences to be unacceptable. The four-year-olds were accurate only about 65 percent of the time. Hakes, Evans and Tunmer (1980) argued quite convincingly that the four-year-olds were responding to the content of the sentences rather than the form. The entire thrust of the Hakes et al. (1980) book, after all, was to show that the development of metalinguistic awareness paralleled

cognitive performances characteristic of the concrete operational period (and thus, children typically older than four years of age). We contend that the Hakes et al. (1980) procedure could in fact have been made even more appropriate for the four-year-olds, and that their results may be underestimates of the capabilities of these youngsters. The major interpretation problems here revolve around the children's understanding of the task, which must be differentiated from their ability to carry out the task, as well as from the judgements or explanations required of them.

Pratt, Tunmer and Bowey (1984) feel that the acceptability judgement procedure should be brought to task because the basis upon which children make such judgements is unclear. Their revision of the talking puppets task therefore involved telling the children that all the sentences heard would be wrong. The child's job was "to show them what to say" (page 136). The stimulus sentences were divided into two conditions - a morpheme correction condition and a word order condition. The five- and six-year-old children who participated in this experiment were better able to correct ungrammatical sentences due to morpheme deletions or changes (90.1 and 93.8 percent correct for the five and six-year-olds, respectively) than they were to correct ungrammatical word order strings (60.4 and 86.0 percent respectively). The children's performances in both of the conditions showed the development of their linguistic awareness

abilities.

Summary

It is clear that amongst the articles reviewed in this section, there is a distinct lack of cohesion. This is evidenced not only in terms of what aspects of language are being studied, but also in terms of methodology and interpretation. (For example, although de Villiers and de Villiers, 1972 found some two-year-olds who were able to make a number of correct judgements of ungrammatical word order which in effect supported the Gleitman, Gleitman and Shipley 1972 results, they were not willing to give this finding any weight. The definitive evidence of grammatical awareness for the de Villiers' was in the ability to make corrections to ungrammatical strings.) Most of the studies covered in this section tested children between the ages of four and eight years (the exceptions being, of course, the studies just mentioned). A very general statement that summarizes the results is that young children (meaning four-year-olds) do not show great linguistic awareness capabilities, but as children get older, they are able to judge syntactically and semantically acceptable and non-acceptable sentences (skills which demonstrate linguistic awareness) with an increasing degree of accuracy. Most researchers would also contend that semantic features of a sentence take precedence over syntactic features in terms of children's comprehension, and thus judgements

and corrections as well. What the studies lack is an indication of the origins of awareness, in that for the most part the youngest children were not young enough to allow researchers to claim where or why this awareness begins. Definitely missing is research dealing with three-year-olds. The following statement by Hakes, Evans and Tunmer (1980) encapsulates the sentiments of probably quite a few of the researchers mentioned in this section:

> "It appears, then, that 4-year-olds, and to some extent 5-year-olds, are strongly disposed toward finding sentences unacceptable because of what they assert rather than because of the linguistic manner in which they convey that assertion. Whether still younger children would also show this disposition remains moot. Younger children have not been asked for their reasons for judging sentences to be unacceptable..." (page 84)

The following sections describe attempts to do experimentally just that, namely, to ask younger children to judge and to try and explain their judgements about the acceptability of normal and reversed word order sentences. The first section covers an adaptation of the Gleitman, Gleitman and Shipley (1972) procedure, which was used in a longitudinal study of two-year-olds. The second experiment changed the methodology and employed a new technique for eliciting judgements from children between the ages of three and five years. The skills of judging and explaining are taken to be behavioural manifestations of the awareness of language. We realize, of course, that the behaviours exhibited may well be task-dependent, but our primary interest was to try and

find a successful way of eliciting such kinds of behaviours from even just a few young children.

THAT'S SILLY: TWO-YEAR-OLDS' RESPONSES TO THE SYNTACTIC ACCEPTABILITY OF SIMPLE IMPERATIVES

Introduction

The language of the child is viewed to be rule-governed. Many researchers who studied child language acquisition in the sixties therefore tried to formulate descriptive grammars for the various stages of acquisition, and tried to discover the processes of change from one stage to the next (Bloom, 1970; Brown, Cazden and Bellugi, 1968; Brown, Fraser and Bellugi, 1964; Miller and Ervin, 1964). Primary data were largely obtained from observational studies - large samples of natural speech were analyzed from small numbers of children. Other performance skills such as comprehension and imitation were studied. The limitations of using performance data to infer linguistic competence are well known to psycholinguists (de Villiers and de Villiers, 1974). Such a data base will not provide the necessary information to develop a theoretical description of the process of language acquisition, just as a linguist cannot talk about the linguistic competence of an individual just from hearing speech samples.

Until this past decade, it was thought not to be feasible to ask a child to judge the grammaticality or acceptability of various word strings. However, if such

judgements could be obtained from young children, a considerable contribution could be made to our understanding of child language. Is it possible for children to contemplate the structure of language, independent of its actual use?

Brown, Fraser and Bellugi (1964) thought not. Their unsuccessful attempts to elicit grammatical judgements from a two-year-old child led them to conclude that

> "children who are first combining words may not have a sense of grammaticality, and it may never be possible to settle on the best general description of their speech output". (page 92)

Gleitman, Gleitman and Shipley (1972) had more success. The two-year-olds in their study could say whether they thought the sentences presented to them were "good" or "silly", although they were not terribly accurate in their judgements. In a role-modelling game (previously described on page 38), Gleitman et al. (1972) elicited judgements of what they described as grammatical well-formedness from the youngsters about simple imperative sentences that were presented in either a normal ("Throw the ball") or reversed ("Ball the throw") order.

De Villiers and de Villiers (1972) modified the Gleitman et al. (1972) procedure by dropping the role-modelling game and employing instead two hand puppets, one which said things "all the wrong way round" and one which would act as a teacher. Their stimulus sentences

included semantically anomalous ones (given in a later session) in addition to the correct and reversed word order imperatives. (This experiment is described in more detail on page 40.) De Villiers and de Villiers (1978) were not impressed with the judgement capabilities of their subjects, whose ages ranged from 2;4 to 3;9, and concluded that they were not

> "optimistic about using judgments as a means of determining the psychologically real rules for child speech." (page 169)

The modifications employed by the de Villiers changed not only the kinds of sentences presented for judgement, but the form of the game itself. A prediction could have been generated just on the basis of the language acquisition literature that would suggest that because meaning takes precedence over structure, the semantic acceptability judgements ought to be easier for the children than those of syntactic acceptability. Thus it comes as no surprise to us that this was precisely what was found.

It still remains to be shown whether or not two-year-old children have the capacity to make judgements about word order - and the study which suggests that they might (Gleitman, Gleitman and Shipley, 1972) needs to be replicated. The present study is an attempt to replicate more closely the Gleitman et al. (1972) procedure, using a larger number of children. First though, some mention must be made of why it was that word order was chosen to be the variable about which

judgements would be asked.

Schlesinger (1971) stated:

"When work on child language was in its infancy (a bare decade ago) it was found that one of the first things which the child learns about grammar is word order and that already at the two-and-three-word stage he tends to follow the adult model. Especially interesting was the observation that a fixed word order was followed even by a child learning Russian, a language in which adult word order varies rather freely." (page 193)

That later research showed a number of exceptions to this only makes the question of whether young children can demonstrate an awareness of word order all the more interesting.

Finally, we should mention one early experiment which first dealt with word order. In a task which asked children aged four-and-a-half to five years to reverse two-unit utterances, Huttenlocher (1964) found that the youngsters had more difficulty reversing utterances that formed common English sequences (for example, "man - runs" and "you - are") than they had reversing numbers or like parts of speech (for example, "5 - 2" and "black - white", respectively). Huttenlocher interpreted this difficulty as reflecting both the semantic absurdity of reversed pairs, and an inability to separate English sequences into word units. However, a task involving such mental manipulation is a difficult one, and this was evidenced in the fact that almost half of the children in the study (13 out of 33) were unable to reverse any pairs. Thus once again methodology is taken to task - the results of the experiment may

underestimate the capabilities of the children which might be shown to exist, under different circumstances.

METHOD

Subjects

The subjects were taking part in the longitudinal study of ten children. There were four boys and six girls, whose ages ranged from 1;11 to 2;10 at the time the present task was administered. The children came from lower middle and middle class homes. With one exception, each was the first born child in the family. All the children were visited in their homes, and their mothers were present.

Test Stimuli

A list of forty simple imperative sentences was constructed, to test for word order, grammatical well-formedness and inflection. The first two classifications were divided into five categories:

1. Correct order (Verb-Article-Object): Read the book.
2. Reversed order (Object-Article-Verb): Book the read.
3. Scrambled order (Verb-Object-Article):Read book the.
4. Telegraphic Correct order (Verb-Object): Read book.
5. Telegraphic Reversed order (Object-Verb): Book read.

There were five sentences in each category, yielding a total of twenty-five. To test for inflection, six couplets (each couplet consisted of one correct and one incorrect sentence) of imperative

sentences were added to the list, bringing the total to thirty-seven. Examples of this type were "Sing a song" versus "Sings a song", and "Come here" versus "Comed here". (Inflections were included because Smith, 1973 found that young children were able to correct sentences with wrong inflection - the experiment is described on page 34.) Three additional correct order imperatives were included to raise the number of well-formed sentences. All forty sentences were then randomized. Appendix B contains a list of the stimulus sentences.

Procedure

The test situation was set up as a role-modelling game, as in the Gleitman, Gleitman and Shipley (1972) experiment. The experimenter explained that some of the things she was going to say would sound "all right" or "good". But some of the things were going to sound awfully "silly" - they would be said the "wrong way". The task was to judge the sentences as either good or silly, repeat the good ones verbatim, and correct the silly ones. The experimenter first read the sentences to the mother who judged, repeated and corrected them. Then the child was asked to play the game, with the mother presenting the sentences. Finally, the child was offered the opportunity of reading the sentences to either the experimenter or the mother. (None of the children took us up on this offer.)[1]

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[1] This was done in the original study, and so was included here.

The entire session lasted approximately one hour, allowing time for the child to adjust to the experimenter, and providing the experimenter with a sample of spontaneous speech. A Uher reel-to-reel audio tape recorder was used to record all sessions.

Transcriptions

All recordings were transcribed by the experimenter, so if there exists any transcriber bias, it should be equal across all the subjects. In order to evaluate the reliability of the transcriptions, a second transcription of two of the tapes was done some months later. Because the first and second transcriptions varied so little from each other, no further statistical measure was taken. In cases where the intelligibility of an utterance was in question, second and third opinions were sought.

RESULTS

Mothers' Responses

For the most part, the mothers' responses to the syntactic acceptability of the sentences were correct, but it was interesting to find that four of the mothers did make a few errors. Judgement errors occurred most frequently in judging a sentence with incorrect inflection ("Drinks your milk") as "good". Correction

errors consisted mainly of correcting the order of the telegraphic reversed order sentences, but omitting the article (for example, "Car push" was changed to "Push car" instead of "Push the car"). One mother in particular adopted this strategy, and in addition, she judged the telegraphic correct order sentences as "good" and repeated them verbatim. The mothers as a group showed a tendency to repeat the well-formed sentences, but often forgot to judge them and had to be reminded.

Children's Responses

Judgements

Four of the ten children did not offer any judgements about the sentences. In fact, two of these children did not give any verbal responses at all. Table 1 lists the number of judgements offered by each child. A Kendall rank correlation coefficient showed that the number of judgements offered increased with linguistic ability (measured here as the median number of syllables per utterance - MNSU): $N=6$, $T = +.83$, $p < .01$. This correlation was much stronger than the one calculated between age and the number of judgements given, for the same six children ($T = +.28$, $p > .10$). (Interestingly, the correlation between age and MNSU for all ten children was similarly not significant: $T = +.21$, $p > .10$. These results are similar to those found by de Villiers and de Villiers (1972), although their measure of linguistic ability was mean length of

Table 1. Number of judgements made by two-year-olds.

Child	Age	M.N.S.U.[1]	Range	Number of Judgements
Scott	2;0	1.72	1-5	0
Tracy	2;0	1.98	1-5	0
Sarah	2;3	2.13	1-6	0
Patricia	2;6	2.37	1-6	0
Richard	2;4	2.72	1-6	2
Julie	1;11	2.82	1-11	1
Robert	2;2	3.58	1-10	2
Susan	2;3	3.83	1-11	9
Brian	2;10	4.14	1-17	14
Caroline	2;0	4.39	1-16	22

[1] M.N.S.U. refers to the median number of syllables per utterance.

Table 2. Percentages of sentences judged to be "silly" by children offering more than two judgements.

Child	Ungrammatical Sentences	Grammatical Sentences
Susan	67%	33%
Brian	50%	50%
Caroline	64%	36%

utterance - Brown's (1973) MLU[1]). Thus, the more linguistically advanced children were able to offer more judgements about the sentences than were the less advanced children. Further, it was not the case that the more linguistically advanced children were older than the less advanced children - age did not correlate with MNSU.

Of the six children who gave judgements, only one child (who also had the highest MNSU) gave judgements of "good" as well as "silly". Most of the children did not judge the sentences, but repeated, changed or corrected them. These results stand in marked contrast to those of both the Gleitman, Gleitman and Shipley (1972) and the de Villiers and de Villiers (1972) studies. In those studies, the children not only offered judgements, but they also gave judgements of "good" or

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[1] The median was chosen here instead of the mean because it was felt to be the more accurate representation of the linguistic ability of the youngsters, given the highly skewed nature of the distributions of lengths of utterances. The median was calculated on all the utterances from the session rather than just the first 100 utterances (proposed by Brown, 1973), again in order to best reflect each child's capabilities - a child would be "penalized" by Brown's calculation if a number of lengthy utterances occurred after the first 100, but with the use of the median, no such utterance limits need be placed. Finally, syllables rather than morphemes were counted for reasons of ease and objectivity. Because a high correlation between calculations of mean length of utterance based on morphemes and syllables has been found by Arlman-Rupp, van Niekerk de Haan and van de Sandt-Koenderman, 1976, it was felt that syllables could be legitimately counted. Syllables were far easier to count than morphemes, particularly in those instances where it was difficult to decipher what the child was saying.

"right". It will be remembered, however, that quite a few mothers in the present study forgot to judge the acceptable sentences as good, and had to be reminded of this very frequently. Thus it can be said in defence of the children's responses, that the children were in fact following the role model; it was just that the model did not always follow the instructions of the task.

Three children offered more than two judgements each. It was not always clear whether they were judging the stimulus sentences, or their own "repetitions" of them:

Stimulus: Drinks your milk.
Susan: Drink milk. Silly

Stimulus: Dress doll the.
Brian: Dress doll the. Dress doll. That's silly!

Table 2 (page 57) shows the percentages of sentences judged to be silly (these included judgements of their own repetitions). Susan and Caroline were more likely to judge ungrammatical sentences as silly (67% and 64% respectively) than grammatical ones (33% and 36% respectively). Brian was just as likely to say "that's silly!" to a well-formed sentence as to an ungrammatical one. This leads us to the question of what it was the children were judging: was it the syntactic acceptability of the sentences, some aspect of the game itself, or the semantic intent of the sentences? It is here that the repetitions, and corrections that the children gave become important. In the Gleitman,

Gleitman and Shipley (1972) study, the children were more reluctant to offer a correction than they were to judge. In the present study, just the opposite was found - the children were more inclined to offer corrections or repeat the sentences than they were to judge them, with one notable exception. Caroline was one of the youngest children studied (2;0), yet she displayed the highest MNSU (4.40). Quite often she would give a judgement but not repeat or correct the sentence. Consider this exchange:

Mother: Can you say "Throw the ball"?
Caroline: Yes.
Mother: Say it then.
Caroline: No.
Mother: Can you say "Ball throw"?
Caroline: No.
Mother: Can you say "Throw ball"?
Caroline: No.
Mother: Can you say "Throw the ball"?
Caroline: Yes.
Mother: Can you say "Ball the throw"?
Caroline: No.

The mother had changed the task from one of role-modelling. (In fact, the questioning technique used by Caroline's mother closely resembled that used by Carr (1979), in a study which elicited judgements about semantic anomaly from young children). Caroline was able to make judgements about the syntactic acceptability of the sentences, but she sometimes was not willing (as opposed to **able**) to repeat or correct them. That she was able to correct is evidenced in the following exchange:

Mother: Dress doll the.
Caroline: That's silly.
Mother: What would you say?
Caroline: Dress the doll.

Repetitions and Corrections

Three-word Imperatives

The children were significantly more likely to repeat verbatim the normal order (grammatical) sentences than they were to repeat the reversed or scrambled order (ungrammatical) ones (see Table 3 for the proportions of repetitions). A sign test performed on the paired responses yielded an exact probability of .008 on a one-tailed test. The difference between the number of grammatical sentences repeated verbatim and the number of ungrammatical sentences repeated as such was positive in all cases.

Responses to the ungrammatical sentences are categorized in Table 4. Only one child correctly changed a reversed order sentence to its normal order counterpart. However, four children were able to change at least one of the scrambled order sentences to normal order, which demonstrated a sensitivity to word order. The most common response that occurred in the "other" category, was a tendency to change either the reversed or the scrambled order sentences into telegraphic ones:

Stimulus: Dress doll the.
Julie: Dress doll.

Stimulus: Car the push.
Robert: Car push.

Stimulus: Wash dishes the.
Susan: Wash dishes.

This is not surprising, as the spontaneous speech of many

Table 4. Three-word imperatives: responses to ungrammatical sentences.

	Reversed Order				Scrambled Order				Inflections			
Child	#	R	C	O	#	R	C	O	#	R	C	O
Scott	-	-	-	-	-	-	-	-	-	-	-	-
Tracy	2:	0	0	2	-	-	-	-	3:	0	1	2
Sarah	1:	0	0	1	1:	1	0	0	2:	0	2	0
Patricia	-	-	-	-	-	-	-	-	-	-	-	-
Richard	4:	4	0	0	5:	2	3	0	6:	0	6	0
Julie	3:	0	1	2	1:	0	0	1	1:	1	0	0
Robert	3:	0	0	3	2:	0	1	1	4:	1	1	2
Susan	4:	1	0	3	4:	1	1	2	6:	0	5	1
Brian	3:	3	0	0	1:	1	0	0	3:	0	3	0
Caroline	3:	2	0	1	5:	0	2	3	3:	1	2	0

# = total number of sentences attempted
R = number of sentences repeated verbatim
C = number of sentences corrected
O = number of sentences changed in some other way

of the youngsters is still in the two-word stage. (It will be remembered that the measure used to calculate each child's linguistic ability was the median number of **syllables** per utterance, and six of the children had medians under three. The sentence "Wash the dishes" contains four syllables). Support for this interpretation comes from Labov (1970), who found that speakers would unintentionally 'correct' sentences they were told to repeat to conform with their own dialect. Also included in the "other" category were one-word responses and responses that de Villiers and de Villiers (1972) classed as semantic responses. For example,

> Mother: Can you say ball the throw?
> Caroline: Ball the throw.
> Mother: Is that not silly?
> Caroline: That's not. I want a ball.

Such semantic responses occurred so infrequently however, that they were not put in a separate category.

Seven of the children corrected the sentences which had the wrong inflection. In total, they correctly changed the sentences more often than they repeated them verbatim or made some other kind of change.[1] This positive result could be interpreted in two ways: 1) the strong claim being that the children recognized the error and corrected it appropriately; and 2) the weaker claim being that they did not hear the incorrect

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[1] A recent article by Pratt, Tunmer and Bowey (1984) also offers support for these results - they found that children were better able to correct morpheme changes than they were to correct word order changes.

inflections and simply repeated what they thought they heard. Support for the strong claim lies in the two instances where the same children both corrected some, **and** repeated verbatim some of the ungrammatical sentences.

Telegraphic Sentences

The children tended to repeat verbatim the telegraphic sentences, regardless of the order of the verb and the object (see table 5 for these responses). In **no** instance did a reversed order telegraphic sentence get changed into a three-word normal order sentence. Two children made changes in the right direction, however:

Stimulus: Car push.
Sarah: Push.

Stimulus: Dishes wash.
Brian: Dishes wash. Silly. Wash dishes.

Five children once corrected the normal order telegraphic sentences into the three-word grammatical counterparts by inserting the missing article. Although the overall number of corrections was small (only 5), each correction demonstrated at least the beginning of behaviour reflecting an awareness of grammatical well-formedness.

Non-Verbal Responses

It is also important to consider the non-verbal responses because

"the child may be linguistically sophisticated in a way that he is unable to display in actual

Table 5. Telegraphic imperatives: responses to ungrammatical sentences.

	Correct Order				Reversed Order			
Child	#	R	C	O	#	R	C	O
Scott	-	-	-	-	-	-	-	-
Tracy	1:	0	0	1	1:	1	0	0
Sarah	2:	2	0	0	2:	1	0	1
Patricia	-	-	-	-	-	-	-	-
Richard	5:	4	1	0	5:	5	0	0
Julie	3:	2	1	0	3:	3	0	0
Robert	2:	1	1	0	-	-	-	-
Susan	4:	2	1	1	1:	3	0	1
Brian	2:	1	0	1	1:	1	0	1
Caroline	2:	1	1	0	3:	2	0	1

# = total number of sentences attempted
R = number of sentences **r**epeated verbatim
C = number of sentences **c**orrected
O = number of sentences changed in some **o**ther way

performance". (Shipley, Smith and Gleitman, 1969)

Shipley, Smith and Gleitman (1969) attempted to tap a portion of children's underlying knowledge about language through the observation of the appropriateness of children's behaviour to semantically and syntactically anomalous sentences.

The two children (Patricia and Scott) who did not give any verbal responses were nevertheless included in the present study. The fact that neither of them would participate in the game could be interpreted in two ways: 1) the testing situation was at fault. The task was not sensitive enough to tap their capacities or 2) the children did not possess the necessary skills to deal with the task. Patricia's response seemed to be the former. She was totally indifferent to the game we were playing and simply played with her own toys. Scott's response suggested the latter interpretation - he actively tried to prevent the game from continuing (by grabbing at the paper that listed the stimulus sentences, by eating the pen, crawling over his mother) and then he started to cry, and tried to leave the room. (The crying continued in subsequent sessions, but only when a version of this particular task was started.)

Another non-verbal response concerned pauses. All children who were presented with over fifteen sentences "paused" at one time or another before

responding to an ungrammatical sentence. A period of no-speech was considered to be a pause by albeit very subjective criteria. A note was made at the time of testing whenever the child took a rather long time to answer. An interval was not considered to be a pause if some environmental distraction took place, or if the child appeared to be looking at a new object to play with. Some examples of pausing before responding were:

Stimulus: Dishes wash.
Julie: (pause) Dishes wash.

Stimulus: Drinks your milk.
Robert: (pause) Drinks your milk.

Stimulus: Read book the.
Richard: Read book the. (pause) Read the newspaper. Read the book!

This latter example demonstrated an "ah-ha!" experience - Richard seemed to "cotton-on" to the task at this point. However, this occurred almost at the end of the session and so is not reflected in Richard's objective scores. The interesting finding about pause behaviour was that pauses only occurred after an ungrammatical sentence had been presented - never after a grammatical one. However, as the measures were so subjective, not much weight will be given to this finding.

The final non-verbal response which was noted was the behaviourally appropriate responses of Tracy. (This is the kind of response studied by Shipley, Smith and Gleitman, 1969.) Upon hearing "Throw the ball", Tracy would do it. She interpreted the imperatives quite literally. There did not seem to be any differential

response to the various ungrammatical strings - given "Ball throw", she would still throw the ball.

DISCUSSION

The approach taken by many psycholinguists studying child language acquisition today involves a consideration of the context in which speech is uttered or elicited. No longer is child language studied in isolation from the situations in which it occurs. Thus experimental methodology takes on new importance.

It became quite apparent as the testing proceeded that two-year-old children are not ideal subjects in an experimental sense. Only three children tackled more than thirty of the forty sentences, rendering statistical analyses difficult. The mothers would often change the task, either through eliciting imitations ("Scott, say 'Ball the throw'"), or by prompting the child ("No. You don't say 'Ball the throw', you say 'Throw____') or in mixing up the presentation order of the stimulus sentences. Nevertheless, it was possible to categorize the responses, and to quantify them in terms of the total number of stimulus sentences each child heard.

Four levels of behaviour are proposed that incorporate the results of the present experiment:

1. the behaviourally specific responses. (These were evidenced by Scott, who was frustrated by the task;

and Tracy, who manipulated the actual objects.)

2. the ability to repeat verbatim most of the grammatical sentences, and fewer of the ungrammatical ones. (Sarah and Julie fit into this category.)

3. the ability to offer judgements as well as to repeat more grammatical than ungrammatical sentences. Grammatical corrections could only occasionally be given. (Richard, Robert, Susan and Brian were assigned to this level.)

4. the ability to judge correctly, as well as the abilities to repeat more grammatical than ungrammatical sentences and occasionally to give grammatical corrections. (Caroline)

It is proposed that the ability to make numerous corrections would be included in the next higher level. Although the children in the present experiment did make some corrections, and did offer changes that were in the direction of well-formedness, these attempts did not occur often enough to credit the children with correction abilities. Whether or not these are actual levels of development or simply different strategies adopted in coping with this particular task is a question that is open to experimental investigation. The follow-up study of these two-year-olds represents an initial attempt to answer this question.

Gleitman, Gleitman and Shipley (1972) and de Villiers and de Villiers (1972) found that semantic factors played a part in the judgements and corrections

given by the children in their experiments. In the present study, only three children changed any of the sentences semantically (and one of these was the child who took the imperatives as a literal invitation to manipulate the objects). For example,

Mother:	Book the read.
Tracy:	This book. (she brings a book over to her mother)
Mother:	Push car the.
Caroline:	Yes.
Mother:	You say that.
Caroline:	Push the car there.
Mother:	Is that not silly? Or is that right?
Caroline:	No. S'not silly.
Experimenter:	Book the read.
Robert:	Put the book in it.

This was an interesting finding, as it was on the basis of the importance of semantic factors in children's corrections that de Villiers and de Villiers (1972) changed the Gleitman et al. (1972) procedure, and thus included semantically anomalous sentences. The present results suggest that while semantic factors were indeed present, they did not have the dominance over responses that de Villiers and de Villiers suggested they would. Instead, the present findings offer more support to those of Gleitman, Gleitman and Shipley (1972). Although they found that children were able to make significantly more correct **judgements** of grammatical than ungrammatical sentences, and we found that children were able to **repeat** verbatim more grammatical than ungrammatical sentences, the results are comparable.

CONCLUSIONS

Because the study of linguistic awareness in young children is such a recent area of research, the norms have yet to be established concerning what reflective abilities children possess, and when and how they develop. The ability to play a game with words is at a fundamental level a demonstration of the ability to treat language as an object. Seven of the ten children in the present study were able to play the game. That they were not terribly good at it is a question for further research - at what stage in development and under what conditions will the children perform well on a task which asks them to judge the syntactic acceptability of sentences? The present results showed that the number of judgements given by the children increased with linguistic ability (as measured by the median number of syllables per utterance).

Finally, the issue of the nature of the experimental task itself must be addressed. In order to take a functionalist approach to the study of linguistic awareness, we must be able to incorporate other elements of the situation into our account of child judgements. Donaldson (1978) made the claim that one of the things children try to do in an experimental situation is to determine what it is the experimenter is asking of them. It is thus up to the researcher to try and create a task that is appropriate to the level of the children.

Throughout the testing of the two-year-olds, it was felt that "something was there" that the role-modelling task was not bringing out. Thus a change of design was called for. The other methodological point to be made is that scoring procedures will have to incorporate the whims of two-year-olds so that they are not penalized unjustly nor given unwarranted credit for their responses. For example, when Caroline was asked whether she could say "Wash the dishes", she replied "No." When asked why not, she said "That's dumb, that's why." Fortunately, her mother realized that Caroline was getting tired of the game; an attitude that once again must be dealt with in dealing with young children.

In conclusion, while our results corroborate those of Gleitman, Gleitman and Shipley (1972) and thus demonstrate that children as young as two years of age can show by certain behaviours that they have at least a little awareness of word order, we are not confident that the methodology employed in the role-modelling task illuminates this ability to its greatest extent.

THE FOLLOW-UP STUDIES

The week after the role-modelling game was played, the experimenter again visited the children individually. This time, the de Villiers and de Villiers (1972) technique of using puppets was adopted. Puppets

were also successfully employed in an experiment conducted by Gelman (1978):

> "We too had the sense that the use of a puppet had the effect of making the child think he was more knowledgeable than the puppet." (page 325)

The two-year-old children in the present study were introduced to two puppets, "Dopey" and "Smartso":

> "Dopey doesn't talk very well. He says silly things. Dopey says things all the wrong way round. Do you want to hear some of the silly things he says? Well, Dopey says 'Car the push'. That's silly, isn't it? Now Smartso talks properly. Smartso knows the right way to say it. 'Push the car'. That's what Smartso would say."

The experimenter then gave Dopey to the child's mother and put Smartso on the child's hand, while explaining that Smartso had to correct all the silly things Dopey would say. The mother then repeated the instructions, with different examples. The same stimulus sentences that were used the week before were used again.

The results of this task can be best described with the statement that the puppet procedure was completely unsuccessful. The children simply would not respond to the task at hand - they were far more intrigued with the puppets themselves than with what the puppets had to say. Scott, the child who previously became frustrated and started to cry, snatched Dopey from his mother's hand and flung the puppet across the room when his mother started to say the sentences in a reversed word order. Brian wanted to hold both puppets, and yelled "No! No!" when his mother tried to get the game going. Robert asked "Why a he got red hair?" and

other questions about the puppets but would not play the game. Even Caroline, the child who previously gave the most advanced responses was more interested in playing with the puppets than through them. Richard was the only child who attempted any syntactic corrections, but he refused to wear the puppet. These results were initially surprising to us, as the previous research had demonstrated such great success with the use of puppets. On further reflection, however, we decided that our lack of success could well be attributed to cultural differences. The children in the present study had not been exposed to puppets to the extent that the American children in the other studies had been. The television programme called "Sesame Street" probably had a strong influence on the American children's acceptance of puppets that were characters from the show. We did not even use "Sesame Street" character puppets, because none of the children in the present study had ever seen the programme. Furthermore, the children in our study were unaccustomed to puppets in general, and many expressed surprise and/or dismay when their mothers tried to place the puppets over their hands. Thus, we concluded that the procedure of using hand puppets to try and elicit judgements of syntactic acceptability was inappropriate for these two-year-olds, because some of the children were able to judge the syntactic acceptability of the same sentences in the previous role-modelling task.

The last recorded session with these youngsters occurred from eight to nine months later. (In the sessions between the second and last, various other tasks that tried to elicit behaviours which manifest the ability to treat language as an object were tried out.) Because there were severe limitations to the puppet procedure and because we were not satisfied with the role-modelling procedure, the task was altered to that of elicited imitation. The questions took one of two forms: the first was the one that had previously been used by Caroline's mother (for example, "Can you say 'Dishes the wash'?"), and was also the technique employed by Carr (1979) in order to obtain judgements about the semantic acceptability of sentences from young children; and the second was simply a shortened version of this (for example, "Say 'Dishes the wash'"). The questions asked were not just about the stimulus sentences, but were also about reversed word order forms of utterances the children themselves produced. (The number of questions asked ranged between 13 and 44.) For example, after Scott said "I want juice", the experimenter asked "Scott, can you say 'Juice want I'?"

RESULTS

Three of the ten children who were initially tested, were not available for testing by the final session. All of the seven remaining children gave verbal responses to the questions. It is important to note that

none of these children made any errors in repeating grammatical sentences. The proportions of responses to the ungrammatical sentences are presented in Table 6. (The ungrammatical sentences included three-word reversed and scrambled order strings as well as telegraphic normal and reversed order strings.) Two of the seven children (Caroline and Richard) were now able to correct the ungrammatical sentences into their grammatical counterparts with a fair degree of accuracy (the proportions of such corrections were .80 and .70 respectively). For example,

Mother:	Richard, can you say 'Book the read'?
Richard (3;0):	Book the read.
Mother:	What should it be?
Richard:	Read the book.

Brian was also able to correct some sentences (his proportion of corrections was .36), and even when he simply repeated the ungrammatical strings, he was open to further probing:

Experimenter:	Brian can you say 'Newspaper the bring'?
Brian (3;6):	Newspaper the bring.
Experimenter:	No. You say 'Bring ...'
Brian:	Bring the newspaper.

The remaining four children repeated verbatim up to 80 percent of the ungrammatical sentences presented to them, although they were sometimes able to respond (as Brian did) to further prompting which involved supplying the first word:

Experimenter:	Scott, say 'Read book the'.
Scott (2;9):	Read book the.
Experimenter:	Read ...
Scott:	the book.

Table 6. Proportions of two-year-olds' responses to ungrammatical sentences: follow-up study.

Child	Repetitions	Corrections	Semantic Responses	Other
Scott	.80	-	.20	-
Tracy	.80	-	.20	-
Sarah	.80	-	-	.20
Richard	.20	.70	-	.10
Julie	.75	-	.25	-
Brian	.55	.36	.09	-
Caroline	-	.80	.20	-

Table 7. Children's median number of syllables per utterance: follow-up study.

Child	Age	M.N.S.U.	Range
Scott	2;9	3.78	1-13
Julie	2;8	4.64	1-14
Sarah	2;10	4.71	1-16
Brian	3;6	5.20	1-19
Richard	3;0	5.25	1-20
Tracy	2;9	5.94	2-23
Caroline	2;7	7.63	2-25

That these children repeated such high proportions of ungrammatical sentences is not terribly surprising, given the fact that the instructions asked for precisely such repetitions.

The few responses that were classed as semantic included responses that changed the meaning of the sentence,

> Experimenter: Brian, say 'Doll dress'.
> Brian: Doll dress. Put clothes on.

as well as those that reflected a literal interpretation such as:

> Experimenter: Julie, can you say 'Letter the post'?
> Julie (2;8): Letter a post. Let me. Let me.

DISCUSSION

In order to examine any developmental changes that may have occurred, it is important to relate the present results to the levels of behaviour that were proposed in interpreting the initial results (see page 69).[1] It will be recalled that the first level consisted of behaviourally specific responses. Both Scott and Tracy, whose responses were previously categorized as belonging to this level, were now able to give verbal responses, and were also able to repeat verbatim more grammatical than ungrammatical sentences. Thus they could be said to have "advanced" to the next higher level (level 2). The two children whose responses were

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[1] We realize that the developmental changes described in this discussion could also be attributed to the changes in methodology from the first to the last sessions.

previously classed at level 2, still gave level 2 responses eight months later (Julie and Sarah). It is interesting that in terms of linguistic ability, these two children showed the second and third lowest M.N.S.U. scores - 4.64 and 4.71 respectively, at this point in time (Scott still had the lowest M.N.S.U: 3.78). (Table 7 (page 78) shows the median number of syllables per utterance for each of the children at the last session.) It is difficult to compare the next two levels with the present results, as the level descriptions incorporate judgement responses which were not specifically asked for this time. However, if the judgemental abilities are omitted, thus collapsing levels 3 and 4 into one level (namely, the ability to repeat more grammatical than ungrammatical sentences as well as the ability to occasionally give a grammatical correction), Brian's responses fit into this category. It was previously hypothesized that the next higher level would include the ability to make numerous grammatical corrections (page 70). The present results indicate that both Richard and Caroline had advanced to this level. Caroline's M.N.S.U. was again the highest (7.63); Richard's was the third highest (5.25); and this was followed by Brian's M.N.S.U. (5.20). Thus the behavioural levels of responses demonstrated by the children are related to their linguistic ability. This supports the results of the initial experiment, where linguistic ability was shown to be positively correlated

with the number of judgements offe red by the children. The only exception to this trend in the follow-up study is Tracy. She demonstrated the greatest advance in linguistic ability (M.N.S.U. was 1.98 in the first session, and 5.94 by the last session), but her level of response did not advance to quite the same extent (she moved into level 2 from level 1). Once again there was no correlation between age and M.N.S.U. ($N = 7$, $\underline{T} = -.05$, $p > .10$).

The present results offer support for the descriptive levels of behaviour, and suggest that they may indeed reflect actual developmental changes. The children either advanced or remained at the same level - not one child regressed to a previous level. Richard and Caroline both demonstrated a sophisticated behaviour that could be said to reflect an awareness of word order, in that they were able to correct most of the ungrammatical sentences, and did not show recourse to semantic changes. In fact, once again it was interesting to note that very few of the children's responses could be classed as semantic responses. This is not to deny the importance of semantics in language acquisition or linguistic awareness, but only to show that children **can** treat language as an object and suspend for a brief moment in time the meaning of the words from the words themselves.

CONCLUSION

The follow-up study that was conducted between eight and nine months after the initial study demonstrated developmental changes in two-year-olds' awareness of word order as measured by their responses of repeating and correcting grammatical and ungrammatical sentences. Of the seven children who participated in the experiments, two advanced from giving behaviourally-appropriate responses to being able to repeat more grammatical than ungrammatical sentences. Two children did not advance, but stayed at the same level. The other three children were able to make some grammatical corrections to the ungrammatical sentences, and thus demonstrated an awareness of grammatical structure.

The elicited imitation task (in the form of "Can you say ..." or simply "Say ..." questions) eliminated the requirement to give judgements about the syntactic acceptability of the sentences. (Only rarely was a "can" question answered with a "yes" or a "no" - the most common response was a repetition.) The next experiment therefore attempted to elicit judgements as well as asking for repetitions, corrections and explanations.

NURSERY CHILDREN'S ABILITY TO DISCRIMINATE BETWEEN NORMAL AND REVERSED WORD ORDER

Introduction

This study followed from the examination of two-year-olds' judgements about the acceptability of normal and reversed order utterances. We wanted to see whether slightly older children, namely those in nursery school would be able to demonstrate an awareness of language, embedded as such in a task that required judgements to be made of whether or not the same stimulus sentences were syntactically acceptable. Although the results of our previous experiment with two-year-olds, along with those of Gleitman, Gleitman & Shipley (1972) offered some evidence that children as young as two years of age could distinguish between correct and incorrect word order, other research has not only disagreed with this, but has suggested that even five and six-year-old children might be unable to tell the difference between normal and scrambled syntax (Bohannon, 1975, 1976; Hakes, Evans and Tunmer, 1980; Ryan and Ledger, 1979; Tunmer and Grieve, 1980; de Villiers and de Villiers, 1972). For example, Bohannon (1976) found that only 22% of the kindergarten children in his study (mean age of 5;9) could discriminate between scrambled and normal sentences. A quote by Ferreiro, Othenin-Girard, Chipman and Sinclair (1976) sums up the situation:

"Grammaticality judgements are a recent and interesting technique which shows much promise. However, this technique only gives interesting results from age 5 upwards (some exceptional subjects notwithstanding)." (page 231)

The discrepancy between these results and those from the two-year-old studies was puzzling. That a few of the two-year-olds studied in this thesis indicated that they could discriminate between normal and reversed order sentences, shows that the ability can manifest itself much earlier than the literature suggests. A task was therefore devised that attempted to elicit judgements about sentences from nursery school children whose age range of three to five years would bridge the gap between the two kinds of studies just mentioned. In addition to judgements, we would ask for explanations, imitations and corrections (when required) from the children. Finally, we wanted the task to be both fun and interesting for the youngsters. This proved to be not as tall an order as it appeared at first glance.

METHOD

Subjects

The subjects were twenty-one English-speaking children who attended a nursery school in Edinburgh. The mean age of the children was 3;11, which comprised a range of ages from 3;4 to 4;11. There were 9 girls and 12 boys in the group.

Test Stimuli and Materials

The same forty sentences that were used in the experiment with the two-year-olds were employed again here (see Appendix B). These consisted of telegraphic and well-formed simple imperative sentences, which varied in terms of word order, and six couplets that tested inflection. In addition, the following practice items completed the list:

I like chocolate.
Teeth your brush.
Open door the.
Sit on the floor.
Stairs the climb.
Away go.

Three audio recordings were made on a Uher portable reel-to-reel tape recorder. An adult native English-speaking male read six practice sentences, followed by the forty test sentences. On each recording, the stimulus sentences were read in a different order.

A bell-and-buzzer board was also employed. On the board, both a bell and a buzzer were connected to different coloured switches, which were attached to a battery. When the white switch (which led to the bell) was pressed, a pleasant /ding-dong/ sound occurred. A rather harsh /zzzz/ sound was emitted when the black switch was pressed.

Procedure

The twenty-one children were divided into three groups of seven (one group for each of the three orders of stimulus sentences), matching as closely as was possible for age and sex. Each child was tested individually in a small room located in the nursery school building. The child and the experimenter sat on opposite sides of a low table. The bell-and-buzzer board was in front of the child and the Uher reel-to-reel tape recorder was in front of the experimenter. Off to one side was a Sony audio cassette recorder which was used to record all the sessions. Each child was first given a demonstration of how a tape recorder worked - the child spoke a few words into the microphone and the experimenter played back the child's voice. The experimenter then gave the instructions for the task:

"Here's what we're going to do today. You're going to hear some things that a man is saying on this tape recorder. This man's name is Tom. But what's funny is that he doesn't always speak properly. Some of the things Tom says are said the wrong way. **You** wouldn't talk that way and I wouldn't talk that way . Some of the things he says though, are Okay - he says them properly. I want you to find which things he says are wrong and which ones are right. Then I can go back to Tom and teach him how to speak properly. Now, you see these two buttons? Press this one and see what happens - /zzzz/. Now press the other one - /ding-dong/. Every time you hear Tom saying something the wrong way, press this button - /zzzz/. That means he's not speaking properly, it sounds funny. You say it the right way. Every time Tom says something properly, you press this button - /ding-dong/ and just repeat what he says, O.K.? Let's listen. I'll do the first ones with you. Listen carefully, and don't listen to <u>what</u> he says, but listen to <u>how</u> he says it."

The experimenter and the child then went through the practice sentences until it was felt that the child understood the task. The child then responded to the forty test sentences, by pressing one of the buttons and then either repeating the sentences verbatim, or correcting them. The experimenter would prompt for these oral responses if the child forgot to give them. Sometimes the children listened and then repeated the sentences verbatim before judging them - a strategy that was initiated by the children themselves. All the sessions were later transcribed.

Scoring

Judgements

One point was awarded for every correct judgement made by the children. This meant that the white button (bell) had been pressed for those sentences that were grammatically correct, and the black button (buzzer) had been pressed for the ungrammatical sentences. Eight categories of scores were calculated for each child: 1) a composite score, which consisted of the number of correct judgements made, out of a possible total of 40 (the number of test stimuli). This composite score was the sum of 2) the number of correct judgements of grammatically well-formed sentences (maximum possible score was 14), plus 3) the number of correct judgements of the ungrammatical sentences (total was 26). The scores in this latter category were simply the total of

the number of correct judgements made of ungrammatical sentences consisting of: 4) inflections (out of 6), 5) three-word reversed order (maximum of 5), 6) three-word mixed order (out of 5), 7) telegraphic reversed order (out of 5) and 8) telegraphic correct order (maximum of 5). The scoring of the judgements was very conservative - sometimes children would hit a button they did not mean to and would quickly press the other, or else they might change their judgement in the middle of a repetition or correction; but only initial judgements were included in the scores.

Corrections

Each child's corrections were tabulated into the appropriate one of five correction categories. These included: grammatical corrections (changing the ungrammatical sentence into its grammatical equivalent); semantic responses (changing the meaning of the string in some fashion); two-word responses (these were correction attempts that usually occurred for telegraphic reversed order stimulus sentences - the word order was corrected, but the article still omitted); "I don't know" responses; and no response at all. A proportion for each child per category was calculated, which consisted of the number of times a child produced a response in a given category divided by the total number of corrections attempted.

RESULTS

Judgements

Eight 3 (order) X 2 (sex) least squares analyses of variance were performed on each of the scores, using the SPSS "classical" approach (Nie, Hull, Jenkins, Steinbrenner, and Bent, 1975). As can be seen in Table 8, the results of all analyses showed no significant main or interaction effects. (For example, in the analysis of the composite score, the effect of order was not significant ($\underline{F}$ (2,15) = 2.69, $\underline{p}$ > .10), sex was not signficant ($\underline{F}$ (1,15) = .06, $\underline{p}$ > .10) and the interaction between order and sex was likewise non-significant ($\underline{F}$ (2,15) = 1.51, $\underline{p}$ > .10).) Thus the children's responses were not affected by the order in which they heard the stimulus sentences. Boys and girls performed equally. Table 9 lists the mean scores for all three groups combined for each scoring category. A number of points can be made. First, the children were fairly accurate in judging grammatical sentences as good, which is reflected in the relatively high mean score in that category (11.62 - the maximum possible was 14). Secondly, they were very good in judging the reversed and scrambled order sentences to be wrong: for three-word scrambled order sentences the mean score was 4.14; for the three-word reversed order sentences the mean score was 4.10; and the mean score for the telegraphic reversed order category was 3.33. All of these categories had a maximum possible score of 5. In short,

Table 8. Word order results: F-ratios from eight 3 x 2 (order x sex) analyses of variance.

Category	F-Ratios		
	Order	Sex	Order x Sex
Composite Score	2.69 (2,15)[1]	0.06 (1,15)	1.51 (2,15)
Grammatical Sentences	1.96 (2,15)	0.62 (1,15)	1.96 (2,15)
Total Ungrammatical	1.48 (2,15)	0.35 (1,15)	0.27 (2,15)
Inflections	3.30 (2,15)	4.68 (1,15)	0.70 (2,15)
3-word Reversed Order	1.62 (2,15)	0.11 (1,15)	0.15 (2,15)
3-word Scrambled Order	0.39 (2,15)	0.35 (1,15)	0.17 (2,15)
2-word Reversed Order	2.02 (2,15)	0.01 (1,15)	1.05 (2,15)
2-word Correct Order	0.03 (2,15)	0.23 (1,15)	0.09 (2,15)

[1] Degrees of freedom for each F-ratio are indicated within parentheses.

Table 9. Mean number of correct judgements of grammatical and ungrammatical sentences by nursery school children.

Category	Maximum Possible Score	Mean Score	Standard Deviation
Composite Score	40	27.71	5.20
Grammatical Sentences	14	11.62	2.62
Total Ungrammatical	26	16.10	5.10
Inflections	6	2.67	1.93
3-word Reversed Order	5	4.10	1.26
3-word Scrambled Order	5	4.14	1.20
2-word Reversed Order	5	3.33	1.32
2-word Correct Order	5	1.86	1.56

Table 10. Mean scores of correct judgements of ungrammatical strings.

2-word Correct Order	Inflections	2-word Reversed Order	3-word Reversed Order	3-word Scrambled Order
1.86	2.67	3.33	4.10	4.14

Underlined means are not significantly different from one another, as indicated by a Newman Keuls analysis.

the children were able to make correct judgements of the syntactic acceptability of normal and reversed word order sentences. This is a strong statement, and stands in particular contrast to the results of previous research (Bohannon, 1976; Hakes, Evans and Tunmer, 1980; de Villiers and de Villiers, 1972 to name just a few). However, it will be argued that the present results are sound, and it is because the methodology has been appropriately revised that such young children are able to demonstrate an awareness of word order.

A single factor analysis of variance with repeated measures (using the BMDP2V program; Dixon, 1981) was performed, to test whether or not there were differences among judgement scores in the first five categories, the ungrammatical strings. The F-ratio was highly significant (F (4,80) = 13.94, $p < .001$) which indicated that the children found some types of ungrammatical sentences to be easier to judge than others. The Newman-Keuls procedure was used to examine differences in the scores, adopting an .05 alpha level.

In terms of difficulty in making correct judgements of ungrammatical structures, the children had the most difficulty with the telegraphic correct order strings, followed by inflections, followed by telegraphic reversed order sentences. They had the least difficulty in accurately judging both the three-word reversed order and the three-word scrambled order sentences (see

Table 10). Thus, the children were more inclined to judge a telegraphic correct order string (Throw ball) as grammatical than they were the reversed order counterpart (Ball throw). They were also more likely to judge sentences with incorrect inflections as being okay than they were any of the reversed or scrambled order sentences. It occurred to us that what the children thought they were hearing might have been a legitimate British-English expression, one that mothers often employ. For example, "Sings a song" may have been heard as "Sing **us** a song" by the children. However, there was no indication of such an extra syllable occurring in their repetitions - and this was verified by a number of adult listeners who were asked to listen to select portions of the tapes. Alternatively, the argument might be made that the children did not actually hear the inflection error, but our data indicate that they did:

Stimulus: Drinks your milk.
Louise: Sounds okay. (presses the bell, an incorrect judgement)
Drinks your milk.

(C.S. Smith, 1973 also found that children did in fact hear the grammatical errors. In addition, it will be remembered from the results of the two-year-old role-modelling game that some of the mothers actually judged sentences with incorrect inflection to be good.)

That the children accepted two-word correct order sentences is not particularly surprising either (support comes from Gleitman, Gleitman and Shipley, 1972;

C.S. Smith, 1973; and the results of the role-modelling study, where once again some of the mothers judged such sentences as good). An example from the present study is in the following exchange:

Stimulus:	Wash dishes.
Matthew:	That's right. Press this one. (presses the bell, an incorrect judgement)
Experimenter:	What did he say?
Matthew:	Wash dishes.

The children's other responses showed that they were sensitive to word order, and thus when the stimulus sentence had the correct order (but lacked an article), they sometimes made judgement errors because they were concentrating on word order, and not the presence or absence of the article.

For the individual differences analyses, a series of Spearman rank correlation coefficients were calculated between age and judgement scores. (Table 11 lists the correlations.) There was a significant positive correlation between age and composite scores (r_s = +.52, p < .01), which indicated that the number of correct judgements increased with age. However, this relation was tempered by the fact that the only other significant correlation to emerge was between age and the number of correct judgements of grammatical sentences (r_s = +.68, p < .001). That is, the children who were the most likely to judge the majority of the grammatically correct strings as being correct, were the older ones. This is not inconsistent with previous

Table 11. Spearman Rank Correlations between age and judgement scores.

		r_s	p
1.	age with composite score	+ .52	.01
2.	age with grammatical	+ .68	.001
3.	age with ungrammatical	+ .08	.36
4.	age with inflections	- .07	.39
5.	age with 3-word reversed	+ .35	.06
6.	age with 3-word scrambled	+ .30	.10
7.	age with 2-word reversed	+ .27	.12
8.	age with 2-word correct	- .17	.23

Table 12. Corrections to sentences judged to be incorrect: average proportion of response categories.

"Don't know" Responses	No Response	2-word Responses	Semantic Responses	Grammatical Corrections
.08	.09	.10	.12	.61

Underlined means are not different from one another, as indicated by a Newman Keuls analysis.

research (Bohannon, 1976; Hakes, Evans and Tunmer, 1980; Ryan and Ledger, 1979; Scholl and Ryan, 1975) which showed improvement with age in the ability to recognize acceptable sentences as such, although these studies typically involved much older children, and a greater range of ages than was present here (see pages 41 to 44 for descriptions of these studies).

It is interesting that age did not correlate significantly with any of the scores from the categories of judgements of the ungrammatical sentences. So although the younger children made more mistakes in correctly judging grammatical sentences to be grammatical than did the older children, they performed about the same as the older children in judging ungrammatical strings to be ungrammatical.

What is most impressive about the results of the judgement scores is that not only were children between the ages of 3;4 and 4;11 willing to make judgements about the sentences, they were also fairly accurate in their judgements: the mean score for the composite category was 27.71, out of a possible 40. This included a range of scores from 18 to 39. Furthermore, even the boy who scored at the level of chance (18 out of 40) "knew" what the task was about:

Stimulus Sentence:	Read book the.
Curtis:	Think that's ok. (presses the bell, an incorrect judgement)

Experimenter:	You say it.
Curtis:	Read book. Can't do it.
Stimulus Sentence:	Ball the throw.
Curtis:	Not that ok. (presses the buzzer, a correct judgement)
Experimenter:	What should he have said?
Curtis:	Throw the ball!

Corrections

When the children pressed the buzzer and thus indicated that they thought the stimulus sentence was ungrammatical, they were asked to say what they thought the sentence should be. The result of a single factor analysis of variance with repeated measures (using proportions of correction responses per category) was highly significant (F (4,80) = 25.77, $p < .001$). The mean proportion of children's responses that were grammatical corrections was .61. The Newman-Keuls method of multiple comparisons indicated that proportions in this response category differed significantly from proportions in every other response category (see Table 12, page 95). Thus, most children gave the proper correction after judging a sentence to be incorrect; that is, they fixed up (or "normalized" as C.S. Smith, 1973 called it) the ungrammatical strings into the proper grammatical version. Shown below are a few exchanges that illustrate this ability to correct:

Stimulus:	Dishes the wash. (three-word reversed)
Paul (4;4):	Dishes the wash?! (presses the buzzer, a correct judgement)
Experimenter:	What should Tom have said?
Paul:	Wash the dishes.

Stimulus:	Comed here. (wrong inflection)
Scott (4;5):	That's wrong I think. (presses the buzzer, a correct judgement)
Experimenter:	It should be ...
Scott:	Come here.

Stimulus:	Car push. (two-word reversed order)
George (4;0):	Very funny. (presses the buzzer, a correct judgement)
Experimenter:	What should he have said?
George:	Push the car.

Stimulus:	Throw ball the. (three-word scrambled)
Tina (3;7):	(presses the buzzer, a correct judgement)
Experimenter:	What should Tom say?
Tina:	Throw the ball.

Stimulus:	Push car. (two-word correct order)
Leslie (4;8):	So it's that one. (presses the buzzer, a correct judgement)
Experimenter:	What should Tom have said?
Leslie:	Push the car.

Occasionally, a sentence was judged to be incorrect, but the children could not correct it. When asked what should have been said, they either did not respond (average proportion was .09) or they said "I don't know" (average proportion was .08). Two other types of responses were noted: two-word responses which were usually order corrections of the telegraphic reversed order stimuli (for example, Gavin's (3;11) response to the stimulus sentence "Doll dress" was "No." He then pressed the buzzer, a correct judgement, and said "Should be. Dress doll."); and corrections that specifically changed the meaning of the sentence (for example, Jennifer (3;11) said "That's not right" in

response to "Throw ball the". She pressed the buzzer, a correct judgement, and said "Kick the ball").[1] The average proportions for these types of responses were .10 and .12 respectively. The latter corrections are those that de Villiers and de Villiers (1972) also classified as semantic responses.

It is impressive that so many of the corrections given were exactly that, and that so few of the corrections changed the meaning of the sentences. This would seem to be at odds with a lot of previous research, which stresses the importance of semantics for the young child as a language learner (Carr, 1979; Donaldson, 1978; Slobin, 1966; de Villiers and de Villiers, 1972 to name just a few). In fact, however, the results from the individual differences analyses will show that the present results are not totally at variance with those in the literature.

A series of Spearman rank correlations were calculated between age (in months) and the proportions of responses per category (see Table 13). There was no correlation between age and proportions of two-word responses (r_s = +.09, p > .10). Two significant negative correlations were found, between age and proportions of

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[1] This particular response could well have been an attempt at semantic normalisation. It could be that Jennifer thought that prototypically, you ought to kick a ball rather than throw it.

Table 13. Spearman Rank Correlations between age and proportions of responses.

		r_s	p
1.	age and "don't know" responses	- .49	.01
2.	age and no response	- .61	.002
3.	age and 2-word responses	+ .09	.35
4.	age and semantic responses	- .27	.09
5.	age and grammatical corrections	+ .64	.001

no response (r_s = -.61, p < .01); between age and proportions of "don't know" responses (r_s = -.49, p < .02). A negative correlation between age and proportions of semantic corrections approached significance (r_s = -.27, p < .09). This latter correlation indicated a trend which showed that the younger the child, the greater was the proportion of semantic corrections given. This finding is thus in accord with the previous work cited.

The largest correlation was found between age and proportions of grammatical corrections. This significant positive correlation (r_s = +.64, p < .001) indicated that the proportion of accurate corrections increased with age. Further analyses (Pearson product moment correlations) indicated that the number of correct **judgements** of ungrammatical strings correlated positively with the proportion of **grammatical corrections** (r = +.42, p < .03), and negatively with the proportion of **semantic corrections** (r = -.49, p < .02). This negative correlation indicated that those children who offered semantic corrections were not very good at judging ungrammatical strings as being ungrammatical.

DISCUSSION

The procedure of using a bell-and-buzzer to elicit judgements of grammaticality from children as young as three years of age appeared to be a successful

and sensitive assessment tool. It was appropriate to the attention span and understanding of nursery school children. One of the reasons for the success at eliciting syntactic judgements from youngsters without having semantic factors predominate may well have been the fact that the task was not simply presented as a game, but actually served some purpose (namely, that of helping "Tom" to speak properly). Another explanation is that in having the stimulus sentences presented by means of a tape recorder, the children were forced to listen quite carefully in order to understand, and they could not rely on facial or lip movements for clues as to what was being said. This probably also helped them to tune in to the syntax of the sentence. The only other research that used a tape recorder for presenting the stimulus sentences (Bohannon, 1976) recorded utterances said by the actual experimenter. (The instructions were:

> "...I have two friends, Norman and Ralph, who talk differently. I went out and wrote down some of the things these guys have said and I put them on tape. I'm going to play these things for you, one by one, and you have to guess who said it..." (page 672)

The children had to respond verbally to a stimulus sentence by saying either "Norman" or "Ralph". It is our contention that the Bohannon (1976) procedure was thus more complicated than the present task, and placed more cognitive demands on the children. Bohannon (1976) did not say if any of the children in his study responded "You" to the question "Now who said it?", but it is quite possible that that response occurred. Furthermore, it

would not be an incorrect response. The extra demands placed on the children were not just that they had to ignore the fact that the sentences were said by the experimenter, and not just that they had to differentiate between grammatical and random order sentences, but that they additionally had to remember the names of each person - "Norman" who spoke grammatically and "Ralph" who did not.

The results of this experiment appear to be at odds with previous work in terms of the age at which children can accurately make judgements about word order. In fact the difference is one of methodology, and the situation can be best described by citing it as a parallel to the work being done in the field of cognitive development. Classic tests of egocentrism and conservation, for example, are continually being modified to be appropriate for younger and younger children, and thus it appears that they are being shown to be less egocentric and more capable of conserving than ever before.

In summary, it can not be stated too strongly that the young children who participated in this experiment demonstrated an impressive sensitivity to word order. Not one child refused to do the task, which in itself indicates a methodological improvement (James and Miller, 1973 had 5 out of their 16 children refuse to participate; Huttenlocher, 1964 lost 13 of her 33

subjects to refusals). The three-to-five-year olds in the present experiment showed an ability to treat language as an object by making judgements as to the grammaticality or acceptability of stimulus sentences, and further, by offering corrections of those sentences judged to be silly. These corrections showed that syntax **could** be made to dominate semantics in children's minds, given the appropriate task.

CONCLUSION

Hakes, Evans and Tunmer (1980) stated:

> "...at the beginning of the preoperational period, children have not yet begun to attend to or taken account of the information conveyed by a sentence's word order..." (page 8)

The present results suggest that this statement and others like it will have to be revised. Young children were shown to have the capacity to judge reversed and scrambled order sentences as wrong and furthermore were able to make syntactically acceptable corrections.

CHAPTER 3: CHILDREN'S AWARENESS OF THE PHONOLOGICALLY ARBITRARY NATURE OF WORDS

BACKGROUND RESEARCH: THE ARBITRARY NATURE OF WORDS AND THE AWARENESS OF AMBIGUITY

There were indications in our study of bilingual youngsters (see Appendix A) that some children as young as two years of age who were being raised in a one-parent, one-language situation were aware of the phonologically arbitrary nature of words, in that they recognized that the name of an object could be expressed with two entirely different-sounding names:

Experimenter:	Guy, comment est-ce qu'on dit "truck" en francais? Sais-tu?
Guy:	Non.
Experimenter:	Une voiture?
Guy:	Non.
Experimenter:	Un camion?
Guy:	Oui.
Experimenter:	What's that?
Jane:	A cat.
Experimenter:	C'est quoi?
Jane:	Un chat. chat.

This finding was supported by research which has stated that bilingual youngsters are more aware than unilingual children of the arbitrary assignment of words to referents (Ianco-Worrall, 1972).

We were interested in seeing whether our monolingual two year-olds would be able to realize that language itself is arbitrary. To accomplish this, we examined their reactions to having a different language

than English (namely, French) addressed to them in the middle of an interaction. In the course of playing with some of each child's toys, the experimenter would switch into French while maintaining normal conversational inflections. It was hypothesized that the children would show some change in behaviour (perhaps by questioning, or interrupting) if they realized that their game partner was not communicating in the same fashion as before. However, not one child questioned the language change. Five of the ten children just kept on playing, but in silence. The other five talked at the same time as the experimenter was talking (in French):

Tracy (2;2): (at same time as experimenter) Mommy goes up sleeping goes up sleeping. Goes up later on. That broken too. That broken too.

Richard (2;5): That's a. That's a butterfly. Butterfly. That's a butterfly.

Robert (2;3): I got hat. A good hat. I not got a hat. Got a hat. Simon. Got a block. Nomli got a blue slippers on. Slippers on.

Caroline (2;1): (playing with her doll) He's cold. He's got cold. Yup.

Brian (2;11): A big thing. Big blue on the truck. Truck's going. Staying. That's stopped.

This kind of "talking to themselves" while continuing to play lasted for as long as the experimenter was speaking in French. As soon as the experimenter switched back to English, the conversation resumed. In some sense, it may have been that the children's way of

dealing with hearing this other language was to ignore it and carry on as if the experimenter was not there.

If this "talking on top of" the experimenter was in fact a recognition of a different language, then it should not occur when their own language (English) was being spoken. In order to test this out, the experimenter memorized a passage from a translation of one of Piaget's works ("If the environment engenders only a common phenotype included in preexisting norms of reaction there is no reason why it should give rise to an endogenous reconstruction ...") This passage was inserted (along with normal conversational contours) in the same way the French passage was inserted in a play situation between the child and the experimenter.

Virtually the same two kinds of reactions were observed in this instance: silent playing (eight children) and simultaneous talking (two children). In only one case did a different response occur:

> Experimenter: If the environment ...
> Richard (2;5): Huh?

We interpret this to mean that these children did not in fact recognize that language was arbitrary in the sense that the name of an object could have two entirely different phonological realizations; the strategies that they used to cope with both situations were probably strategies often used when they did not understand what was happening. For instance, occasionally at either the beginning or the end of the sessions, the mother and the

experimenter would talk together while the child was in the room. The tape recordings of these sessions revealed that some of the children were talking as well, while playing with their toys. The only thing that was unusual about the "French" and the "Piaget" situations was that the experimenter was not holding an adult conversation with another adult, for only the experimenter and the child were present.

To sum up these observations, it can be said that two-year-old monolingual children did not demonstrate that they had the ability to realize the arbitrary nature of language insofar as these tasks were concerned.

According to Bowey and Tunmer (1980), in order to be assessed as showing full word awareness, a person would have to demonstrate:

> "1. awareness of the word as a unit of language.
> 2. awareness of the arbitrary nature of the phonological realization of a "grammatical word" (Lyons, 1968; page 69).
> 3. comprehension of the metalinguistic term **word**." (page 32)

It is the second component that most concerns us here.

Studies dealing with the phonological arbitrariness of words can be traced back to 1929, and Jean Piaget. In an interview situation, he asked children of five through twelve years of age questions concerning the origins of names ("Where is the name of the sun?"), and whether or not object names could be

interchanged ("Could the sun have been called "moon"?"). Consistent with his developmental stages, Piaget (1929) classified the responses to the origin questions into three categories. The youngest children (five and six years old) would typically describe the name of the object as coming from the object itself - the name was an essential, albeit invisible, part of the object. Children in the second stage (seven and eight years of age) would admit that the names of objects were in the air, but not that the names originated in the mind. Third stage children however, (nine or ten years of age) answered that the names of objects are "in the head". Vygotsky (1962) reported similar findings for the younger children, in that he noted that preschool children

> "explain the names of objects by their attributes. According to them, an animal is called "cow because it has horns, "calf" because its horns are still small, "dog" because it is small and has no horns." (page 129).

Rather than asking the two-year-olds who participated in the longitudinal evaluation questions like why is an animal called "cow", we indirectly asked them if the names "animal" and "cow" could be interchanged:

Experimenter: Is that an animal?
Tracy (2;8): No. They're cows.

Experimenter: Is that an animal Scott?
Scott (2;8): No.
Experimenter: What is it?
Scott: Horsie.

Experimenter: Is this an animal Julie?
Julie (2;7): No. That's a duck.
Experimenter: Tell me what an animal is.
Julie: That's just a duck.

Experimenter: Is this a fruit?
Sarah (2;9): 'ats a plum. Not fruit.

Experimenter: Is this a vegetable?
Susan (2;10): No. It's a carrot.[1]

It can be seen from the above examples that most of the children were not willing to let an object be called two names. Two children, however, showed the glimmerings of an ability to separate a word from its referent:

Experimenter: Are these animals?
Caroline (2;6): Yes they are.
Experimenter: What else are they called?
Caroline: Elephants.
Experimenter: Are lions animals?
Caroline: Yes they are.
Experimenter: Are birds animals?
Caroline: No they aren't.
Experimenter: What are they?
Caroline: They're just birds. They're just birds. Not animals.

Experimenter: Is that an animal Brian?
Brian (3;5): Yes. Goat.
Experimenter: Is it an animal too?
Brian: Yes it's an animal.
Experimenter: Is that an animal?
Brian: No. It's a bird.
Experimenter: Is this an animal?
Brian: Yes. It's rhinoversus.
Experimenter: Brian are you an animal?
Brian: No!
Experimenter: Am I an animal?
Brian: No!
Experimenter: Why not?
Brian: You're not.
Experimenter: Well, what's an animal?
Brian: A horse is.

But just when you think you are getting somewhere:

Experimenter: Is a carrot a fruit?
Brian: No, it's a shoemaker!

However, it can be said that these two children (Caroline and Brian) were beginning to show signs of recognizing that an object could have more than one name.

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[1] These children were not without some understanding of the terms animal, fruit and vegetable - they could readily name numerous examples of each.

It is also interesting to note that these two children also had the two highest median number of syllables per utterance of all the children at this point in time.

From children's answers as to whether or not object names could be interchanged, Piaget distinguished two stages: the first included children before the age of ten years, who claimed that names could not be interchanged; while the second stage consisted of children older than ten years of age who agreed that the sun could have been called moon and the moon, sun. Vygotsky similarly found that children thought the names of objects could not be interchanged:

> "When asked whether one could call a cow "ink", and ink "cow", children will answer no, "because ink is used for writing, and the cow gives milk"." (page 129)

More recent experimental studies have suggested, however, that children's ability to differentiate the word from the referent may have been underestimated. Ianco-Worrall (1972) changed the wording of the questions such that the children were asked:

> "Suppose you were making up the names for things, could you then call a cow **dog** and a dog **cow**?"

A higher percentage of children (between the ages of four and six years) could correctly answer this form of question than they could the direct form of question (Could a cow have been called **dog** and a dog **cow**?). Using a similar 'supposition' kind of framework, Osherson and Markman (1975) reported that all their children (in

grades 1, 2, 3, 6, and 10) agreed that words could be interchanged. Recently, an even simpler form of this task was devised and administered to a small number of three-year-old children (Sinclair and Holobow, 1984). Each child was shown a book, a glass and a spoon and was asked to name the objects. Then the experimenter suggested that, just for fun, they "change the names of the objects and call them something different". The experimenter suggested they call the book a 'tig', the glass a 'lum' and the spoon a 'bem'. The objects were rearranged and the experimenter then asked the child for an object, using the new name. Sixty percent of the children completed the task with 75 percent accuracy.

Osherson and Markman (1975) also studied children's awareness of the non-physical nature of words by asking the children four questions of the form "Is the word **book** made of paper?" All of the children performed poorly on this task - and not even all of the oldest children passed, that is, answered all four questions correctly.

We repeated Osherson and Markman's (1975) non-physical nature of words task with much younger children, aged between 3;4 and 5;0. These children (eighteen in total) attended a nursery school run by the department of Psychology of the University of Edinburgh. Each child had just completed a session of pilot testing for another experiment, and was asked three questions at the end of

the session. It was thought that one reason why Osherson and Markman (1975) obtained such poor results may have been because the younger children had difficulty comprehending the word **word**. Perhaps the substitution of **name** for **word** in the questions would enable more children to answer correctly. With this in mind, half the children answered **name** questions, and the other half answered **word** questions:

1. Is the **name/word** book made of paper?
2. Can the **name/word** nail be hammered?
3. Can you bake a cake with the **name/word** flour?

Only two children answered any of the questions correctly, but they were unable to explain their answers:

Experimenter:	Can the **word** nail be hammered?
Kirk (3;11):	No.
Experimenter:	Why not?
Kirk:	That's still... Ought not be... Don't know.
Experimenter:	Why not?
Kirk:	I don't know.
Experimenter:	Can a nail be hammered?
Kirk:	Yes.
Experimenter:	Can you bake a cake with the **name** flour?
Tina (3;7):	No.
Experimenter:	Why not?
Tina:	Because... Don't know.
Experimenter:	Can you bake a cake with flour?
Tina:	Oh yes.

In general, the children agreed quite readily that the **word** or **name** book was made of paper, and gave the same incorrect responses for the other two questions. Thus we replicated the Osherson and Markman (1975) results, and suggest that the task is too difficult for young children. In fact, we are not convinced that this particular metalinguistic task is a valid one. It was

evident on the basis of the results of the pilot testing for another experiment that some of these same children exhibited a rather sophisticated awareness of lexical ambiguity that others did not. A task such as the awareness of the non-physical nature of words would not capture the ability to treat language as an object that young children **can** demonstrate.

Children's comprehension of the word **word** improves steadily when they are taught how to read. Francis (1973) asked children to tell her a word, and found that at age 5;9, only 22 of her 50 subjects could do so but at the age of 7;3, almost all the children could. In a series of experiments, Downing (1969, 1970, 1971) employed an aural discrimination task using five-year-olds which involved having the children pick out the words from a tape consisting of non-human noises, words, phonemes, phrases and sentences. It was found that even the most advanced five-year-olds had a poor understanding of the word **word**, but that understanding improved with age and school experience. This finding was replicated by Downing and Oliver (1974).

The study of children's awareness of lexical ambiguity can be subsumed under the larger heading of awareness of ambiguity. This awareness demands that one suspend the influence of a particular context, in order to be able to see the possible alternative. It is the recognition that certain words, phrases or sentences can

mean different things depending on the context. Four types of ambiguity have been studied: phonological; lexical (where a single word has two or more meanings); surface structure (where two different groupings of adjacent words are possible, as in "big boys and girls"); and deep structure ambiguity (where a change in the logical relations between words occurs, as in "the shooting of the hunters was terrible").

Kessel (1970) studied the development of children's ability to judge sentences as ambiguous, using as stimulus sentences ones containing lexical, surface structure and deep structure ambiguities. He asked five-to-ten-year-olds to select the pictures that depicted a spoken sentence, from an array of four pictures of which two would be appropriate if the double meaning was recognized. For example, the two appropriate pictures for the sentence "The shooting of the soldier was bad" were ones which showed a soldier being killed and a soldier pointing a gun. Even Kessel's youngest subjects were able to choose the appropriate pictures for lexically ambiguous sentences, but only children of eight years of age and older could detect both meanings of structurally ambiguous sentences. Further, there was no difference between surface and deep structure ambiguity - both were detected at the same time.

Shultz and Pilon (1973) used the form of the riddle to study the development of awareness of all four

types of ambiguity. They found differential rates of development for each of the four types: detection of phonological ambiguity appeared first, and children between the ages of six and nine years showed the largest improvement; detection of lexical ambiguity occurred next and improved across the age span of six to fifteen years; it was not until the age of twelve that detection of surface and deep structure ambiguities appeared.

Lexical ambiguity tasks offer an alternative to the traditional word-referent tasks which can be criticized for their utilization of the term "word" in an attempt to tap awareness of the word. What the child must be aware of, in a lexical ambiguity task, is that at least two referents share a common phonological realization. Thus, if children can show an awareness of lexical ambiguity, this could mean that they are able to separate word from referent, and meaning from word.

The development of riddle play, signifying an awareness of linguistic ambiguity, has been studied by Sutton-Smith (1976). By having school children tell him riddles, he was able to determine that riddle play develops rapidly in the first couple of school years, and reaches a peak in the third grade. A sharp decrease in the frequency of non-riddles from grades one to four was reported by Bowes (1979). Both Bowes (1979) and Sutton-Smith (1976) also found that the most common riddles given by children played upon lexical ambiguity. Hirsh-

Pasek, Gleitman and Gleitman (1978) also found that children in the first grade (six to seven years of age) were aware of the lexical ambiguity of certain jokes.

These riddle studies, while indicating that first-grade children may be aware of and enjoy lexical am biguity, suggest that this ability may not be present in children younger than six years of age. There are three important notions to consider here. Firstly, as Fowles and Glanz (1977) have suggested, familiarity with both riddles themselves and riddle-telling behaviour probably increases with age. Thus social experience must play an important role in the development of this kind of linguistic awareness. Secondly, the development of the child's vocabulary must also play a part. And thirdly, the riddle comprehension task makes considerable cognitive demands (the incongruity involved must be both understood and resolved).

On the basis of this research, one would have to predict that the likelihood of a child as young as three years of age being able to tell and appreciate a riddle would be fairly slim. It is therefore very interesting to note that the riddle quoted at the beginning of the thesis was offered by a three-year-old. We had just finished a task and were preparing to return to the nursery when Greg burst forth with his 'octopuss' riddle. Because Greg was involved in much of the pilot testing that was done for the experiments

described in this thesis, it may have been the case that he was quite attuned to the kinds of games the experimenter was asking him to play, namely, word games. But even this focus would not necessarily help him in telling the riddle correctly, and typically, children at this age have a great deal of difficulty in correctly remembering riddles and jokes - they leave out parts, they do not set up the incongruities and they often give away the punch lines.

Goldstein (1976) was interested in using the comprehension of ambiguity as a strategy for assessing the relationship between language and cognition. Drawing from the work on ambiguity that has been mentioned above, he took the principles of substitution (lexical ambiguity), grouping (surface structure ambiguity) and logical relations (deep structure ambiguity), and compared them with tasks (which had been designed by Kofsky, 1966) based on the same three principles that Inhelder and Piaget (1964) viewed as underlying the comprehension of classification problems. Following the Genevan argument that linguistic structures are based on prior cognitive structures, Goldstein (1976) predicted an order of increasing difficulty for his six tasks, three of which were ambiguous sentence tasks, and three of which were classification tasks: multiple-class membership, lexical ambiguity, horizontal reclassification, surface-structure ambiguity, hierarchical classification followed lastly by deep

structure ambiguity. Although his predictions did not entirely hold up, (the obtained order of difficulty was horizontal reclassification, multiple-class membership, lexical ambiguity, deep structure ambiguity, surface structure ambiguity and hierarchical classification), the hypothesis itself was interesting.

The research to follow investigates young children's awareness of lexical ambiguity, referred to here as the capacity to dissociate word from referent. Bowey and Tunmer (1980) stated that:

> "the extension of the linguistic ambiguity paradigm to even younger children may be instructive, although the lower level of vocabulary development in these children might render this task difficult". (page 42)

A task was therefore devised that was not critically dependent on a child's level of vocabulary.

YOUNG CHILDREN'S AWARENESS OF LEXICAL AMBIGUITY: THE FIRST HOMONYM EXPERIMENT

Introduction

According to Mackay & Bever (1967), an ambiguous stimlus is one that is capable of two and only two interpretations. When lexical ambiguity occurs in a sentence, the comprehension of the ambiguity of the sentence requires not only lexical and syntactic knowledge, but also an awareness or appreciation of the fact that a word has two referents. Thus the study of lexical ambiguity has implications that concern both developmental psychology and psycholinguistics. Research in language acquisition has shown developmental sequences in the comprehension of ambiguity. Kessel (1970) and Shultz & Pilon (1973) reported that children five to six years of age are only able to show an awareness of lexical ambiguities, while older children (8 to 10 years) can appreciate surface and deep structure ambiguities. The present research is an attempt to determine if younger children yet (those between the ages of 3 and 5 years) demonstrate, or **can** demonstrate an awareness of lexical ambiguity.

In a study of functional asymmetry, Campbell and Bowe (1978) used homonyms. In a story-telling situation they examined preschoolers' comprehension of

certain homonyms:

"That afternoon, Jane and her **Mummy** and Daddy, went for a picnic in the car. As they were driving along they saw a **hare** run across a field... The field was full of corn and they saw a little mouse sitting on one of the **ears**..."

The children were asked to draw pictures of the homonyms after the story had been told. Many of them drew pictures of the "familiar" sense of the homonyms, rather than the "secondary" sense of the words used in the story. This result can be seen as being contrary to the notion that young children's interpretations of language are influenced by context. However, it may have been that the "secondary" meaning was unfamiliar to the children, and when asked to do another task (drawing) after listening to the story, they treated it as a different, unrelated activity. The study to be reported here differs from the Campbell & Bowe (1978) task. In order to tap awareness of lexical ambiguity an incongruity is set up. This was done through the selection of homonyms, both of whose meanings were familiar to the children. Visible context in the form of an object was provided in one aspect of the task, and the story-telling procedure was dropped.

It has recently been proposed that what characterizes the thought of the preschool child is not the lack of certain intellectual skills, but rather the inability to use them in a variety of situations (Donaldson, 1978). In particular, the preschool child is no longer considered to be "egocentric" in the Piagetian

sense.

We propose that linguistic awareness can be looked at in a similar way to cognition - in that children may have an inability to use their linguistic awareness skills in a wide range of contexts. Linguistic awareness at a very fundamental level refers to the ability to treat language as an object in its own right. Moreover, it implies a dissociation between the normal use of language (speaking and hearing), and reflection on that language. As such, the study of the development of linguistic awareness can be seen to be similar to the study of the development of "context-free" thought, in that context-free thought is evidence of the ability to shift perspectives, to see things from a variety of viewpoints that can be independent of the immediate situation. The development of this ability to adopt another's point of view has been studied by Light (1979), among others, in terms of the role-taking skills young children possess. This briefly summarizes the theoretical position we proposed in the introductory chapter.

The present study takes account of this theorizing in proposing four hypotheses:

1. Some preschool children will be able to demonstrate an awareness of lexical ambiguity.

2. The expression of linguistic awareness is not an all-or-nothing affair - the lexical ambiguity task will

yield a range of responses.

3. Preschool children who score well on the ambiguity task will also score well on the role-taking task.

4. A developmental trend will occur - for as language develops with age, so should the expression of linguistic awareness.

METHOD

Subjects

The subjects consisted of 26 monolingual English-speaking nursery school children, aged between 2;8 and 4;8. (Originally there were 28 children, but two refused to participate in the role-taking task and they were eliminated from subsequent testing.) All attended a nursery school in Edinburgh. Two groups of thirteen children each were formed, matching as closely as was possible for age and sex. Each group was composed of 6 boys and 7 girls. The mean age of Group A was 3;8 and that of Group B was 3;9.

Materials

Homonym Objects: There was a total of 22 objects (small enough to be handled by the children), representing both meanings of the 11 homonyms used in the experiment. The homonyms included flour/flower[1];

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[1] For ease in reading, the homophones "flour" and "flower" are referred to here as homonyms.

glasses (drinking, eye); horn (cow, music); nail (metal, finger); needle (sewing, knitting); paper (news, wrapping); pipe (metal, smoking); plug (sink, electric); rubber (shoe, eraser); stamp (postage, rubber); and straw (field, drinking).[1]

Homonym Questions: Two lists consisting of 27 questions each were constructed, one for each group of children. The questions were used to elicit judgements about the semantic acceptability of the sentences. The lists differed in respect of which meaning of the homonym was selected. For example, a List A question was "Can glasses be drunk out of?" while the corresponding List B question was "Can glasses be worn?" Pilot testing determined the nature of the questions. As opposed to a "Could you ..." form of questioning, it was found that the "Can a ___ be ___?" form drew the most attention to the word or object under consideration, away from a personal interpretation (for example, when one of the pilot group children was asked "Could you smoke a pipe?", the response was "No. Only Daddies can a smoke pipe.")

There were three kinds of questions asked:

1. Word Questions. An example of a word question is "Can a **flower** be planted?"

2. Object Questions. An example of an object question is "Can this be planted?" upon showing the child a bag of **flour.**

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[1] Because it was difficult to find appropriate homonyms for the youngsters, some of the ones used may not be considered true homonyms.

3. Distractor Questions. An example is "Can this be planted?" and showing the child a **paper clip.**

There were 11 questions each of the word and object variety, and 5 distractor questions. The distractors were included for two main reasons: first to prevent an alternate yes/no response pattern from occurring, and second as an added insurance that what was being measured was in fact behaviour in which the awareness of lexical ambiguity was embedded. (If the child "cottoned-on" to the incongruities, the distractor items might elicit different responses, such as surprise, laughter, etc.) The two lists of questions are provided in Appendix C.

Role-Taking Task: This task was adapted from one of the series of tasks used by Light (1979) to determine the social sensitivity of four-year-olds. The present task was what Light called "the first orientation problem" and was used here because it was the one that showed the highest intercorrelations with all of his other tasks. Further, under a principal-components analysis, this task showed the highest loading among uniformly positive loadings of all eight measures.

Two simple two-dimensional human figures were constructed of paper and cardboard, a boy figure to be used for the boys, and a girl figure for the girls. (The sex of the figure was apparent due to hair and clothes.)

Procedure

Each child was first administered the role-taking task followed by the homonym task on a different day. After the role-taking task was completed, each child was asked to identify the homonym objects. The testing took place in a small room in the nursery school building. The experimenter scored responses on scoring sheets which had been constructed on the basis of pilot testing responses. (Appendix D contains a sample scoring sheet.) All sessions were recorded using an audio cassette tape recorder. Children from Groups A and B were alternately tested.

The Homonym Task: The experimenter sat facing the child across a small table. Homonym objects not being presented were hidden from the child's view. The instructions were the following:

"I'm going to ask you some questions and I want you to answer them. You can say **yes** or you can say **no**, and if you don't know, just say **I don't know.** Alright? For example, can a pen be used to write with?"

The questions from the lists were then asked in the following manner, using **nail** from List A as an example:

1. Word Question. "Can a nail be hammered?" If the child answered with a "yes", the experimenter went on to the object question and/or the distractor question. If the response was "no", the child was asked "What can be done with a nail?", was then shown the metal nail, and again asked "Can a nail be hammered?" It was important that each child come to agreement on this word question

before the next one was asked.

2. Object Question. "Can **this** be hammered?" The experimenter showed the child the finger nail. If the child had answered "yes", the experimenter then asked "How?" If the answer was "no", the child was asked "Why not?"

3. Distractor Question. "Can **this** be hammered?" The experimenter showed a distractor object and followed the same format as for the object question. (Of course, a distractor question was not asked for all the homonyms, only five of them.)

The questioning technique was loose enough to allow the experimenter to probe further, dependent upon the child's justifications. The children were encouraged throughout to explain their answers. All the children seemed to enjoy the task, which took approximately 15 to 20 minutes to complete.

The Role-Taking Task: The administration of this task was identical to that devised by Light (1979). "O" here refers to the observer (experimenter) and "C" to the child:

"To begin with O and C sat together on the same side of the table while the figure, lying flat on the table, was placed in a 'neutral' sideways position. O then turned the figure to a position such that both he and the child could see it the right way up and said e.g.: "Look at this boy - he's up the right way isn't he? Standing up the right way". O then rotated the figure through 180° and said: "See, now he's upside-down, standing on his head, isn't he?" Returning the figure to the neutral position (this being done between all trials), O asked the child first to "Put him so that we can see him the right way up, standing up the right

way' and then to 'Put him so that we can see him upside down, standing on his head." The observer then stood up and went round to the other side of the table, drawing the child's attention to this by saying: "Now if I go round here...," and then he asked the child to "Put the boy so he's the right way up for me, so that I can see him up the right way." The next instruction was to put the figure so that the child himself could see it up the right way, and then finally the child was instructed to put it so that O could see it upside down. Regardless of the child's placement of the figure, O always asked after each, e.g.: "Can I see him up the right way? Are you sure?" These queries did force the child to consider, and sometimes to reconsider, his placements, but the child was never corrected explicitly. The sequence of 'trials' may be summarised as follows:

(a) Right way up for both O and C.
(b) Upside-down for both O and C.
(c) Right way up for O.
(d) Right way up for C.
(e) Upside down for O." (pages 36,37)

Generally, the children seemed to enjoy the task, which was completed in about five minutes.

Scoring

Homonym Questions: Word Questions: Each initial correct response was given a score of one. Thus a total score of 11 indicated that all questions had initially been answered by a "yes" response (or a head nod). Even though all children eventually did give a "yes" answer, only their first response was scored.

Object and Distractor Questions: For the quantitative analysis, each correct response was given a mark of one. A score of 16 indicated that all questions had been answered "no". The total score for the homonym task was the sum of the scores from the word, object and distractor questions. The maximum possible score was thus 27.

For the qualitative analysis, the explanations (verbal and non-verbal) were categorized according to the nature of the explanation, be it functional, linguistic, 'don't know' or other (see Appendix D).

Role-Taking Task: For a number of reasons, Light's (1979) classification scheme of responses was not adopted here. (It could well have been the case that the changes which had to be made stemmed fundamentally from a difference in the ages of Light's children and those who participated in the present experiment. Light's (1979) children were all aged between 4;0 and 4;1 at the time of testing, as opposed to the children here, whose ages ranged between 2;8 and 4;8.) Firstly, the "egocentric" children (those who always positioned the figure in relation to themselves) in the present experiment were not typically inattentive, as they were in Light's (1979) experiment. Secondly, there were no children in the present experiment whose responses fit into his fourth category (children who changed their placements, and changed them back again). Thirdly, there was no provision made in his classification scheme for children whose placements were correct on orientation-to-other trials, but who erred on orientation-to-self trials. Fourthly, Light (1979) had no category that was suitable for children who made only one orientation-to-other error, but did not seem to know how to correct it. Finally, we thought there should be a category that included children who stood the figure up instead of

leaving it lying flat. In short, it was felt that Light's (1979) classification scheme was too restricted and did not cover the wide range of responses that was exhibited by the children who participated in the present experiments. Because his classifications were ad hoc, we also felt that we could take the liberty of suggesting some ad hoc classifications of our own.

Accordingly, a scoring procedure was developed that took account of the variety of responses that was observed. The scoring sheet that was constructed to record the responses made the classification task easier (see Appendix E for a sample scoring sheet). Responses were classified into twelve categories. A score of 0 characterized a child who could not have understood the task - all answers were either 'inverse' or 'other', and prompting had to be given. At the other end of the scale, a score of 11 characterized a child who gave correct responses (decentred) on all trials, with no sign of confusion in responding and needed no prompting. (See Appendix F for the classification scheme.)

Analyses

A series of nonparametric tests was carried out on the data to determine the relationship between the tasks, and the possible effects of age, group or order. In order to ensure that effects were not item-specific, the frequencies of correct and incorrect responses per

homonym were noted. Because both groups of children consistently gave more correct responses than incorrect responses about each of the eleven homonyms, and because we had already verified that both meanings for a given homonym were in each child's vocabulary, it was felt that no further item analysis was necessary. Explanations and justifications were analysed in a descriptive fashion that reflected individual and group differences.

RESULTS

The Homonym Task

A Mann-Whitney U Test was performed on the scores of the **word** questions, to see if there was a difference between the two groups of children due to the initial meaning asked them. The results of this test were not significant ($U = 81.50$, $n_1=13$, $n_2=13$, $p > .10$) Thus there were no grounds for rejecting the null hypothesis which states that no difference exists between the groups. We interpret this to mean that the two lists of questions were comparable - that one set of senses of a homonym was not more salient than the other.

To determine if there existed a difference between how children responded on the word question (strictly verbal) and how they responded on the object question (verbal + object presentation) a Wilcoxon Matched-Pairs Signed-Ranks Test was carried out on the scores from the word and object (minus distractor) tasks.

The results indicated that there is a difference between the scores, in that the **word** questions were answered correctly more often than the **object** questions (T = 62, N=23, p = .02 for a two-tailed test). Thus the children responded correctly more often when asked a verbal question than they did when asked a question with an (incongruent) object present.

Table 14 presents the correlations on which the following discussion is based. It was predicted that a developmental trend would occur. To test this prediction, a Kendall Rank Correlation Coefficient was obtained between scores on the homonym task and age. The homonym task scores consisted of the total number of correct responses for both the word and object (including distractor) questions. The maximum possible score was 27. (The Kendall correlation coefficient was chosen so that it could be used in subsequent partial correlation analyses. The Kendall tau is equally as powerful as the Spearman rho in rejecting the null hypothesis (Siegel, 1956)). A significant positive correlation was found (T = +.25, z = 1.78, $p < .05$), which indicated that performance scores on the homonym task increased with age. However, there were some interesting exceptions to this trend, and these will be discussed later.

A Mann-Whitney U Test used to test for any possible sex differences was not significant (U = 89.50, n_1=12, n_2=14, $p > .10$). Thus there was no difference

Table 14. Kendall Rank Correlations between age, homonym scores and role-taking scores.

		T	z	p
1.	age with homonym scores	+ .25	1.78	.04
2.	age with role-taking scores	+ .26	1.83	.03
3.	role-taking scores with homonym scores	+ .32	2.30	.01

between the scores for the boys ($\underline{M}$ = 23.00) and those for the girls ($\underline{M}$ = 23.36).

The Role-Taking Task

A significant positive correlation was found between scores on the role-taking task and age ($\underline{T}$ = +.26, $\underline{z}$ = 1.83, $\underline{p} < .05$). Older children were generally better able to shift perspectives than younger children.

Relationship Between the Two Tasks

A highly significant positive correlation was found between scores from the homonym task and scores from the role-taking task ($\underline{T}$ = +.32, $\underline{z}$ = 2.30, $\underline{p} < .01$). This was particularly interesting in light of the third hypothesis - that pre-school children who score well on the ambiguity task will also score well on the role-taking task. (Table 15 lists the children's scores on both the homonym and the role-taking tasks.) Because this hypothesis is of theoretical importance, we wanted to see just how strong this relation would be, if age could be held constant. To do this, a Kendall Partial Rank Correlation Coefficient was calculated, holding age constant: $\underline{T}_{xy.z}$ = +.28, N=26. Since +.28 is not much smaller than +.32 (the correlation between homonym and role-taking scores), we might conclude that the relation between homonym scores and role-taking scores is relatively independent of the influence of age. (This

Table 15. Children's scores on the first homonym and the role-taking tasks.

Child	Age months	Total Homonym Score	Role-Taking Score
Nancy	55	24	11
Richard	49	24	11
Mark	56	23	10
Kelly	35	23	10
Derek	52	16	10
Kurt	43	24	9
Graham	52	17	8
David	55	16	8
Tara	53	22	7
Kate	34	15	7
Mary	38	13	6
Chad	55	23	5
John	38	18	4
Anne	53	21	3
Danny	35	14	3
Jackie	46	23	2
Alison	55	22	2
Leslie	37	22	2
Kim	46	19	2
Lorraine	46	15	2
Shirley	46	18	2
Chris	55	12	2
Carol	49	22	1
Susan	37	22	1
Lynn	32	13	0
Brian	35	11	0

would be supported by Siegel, 1956, page 228. There still does not exist a test of significance of $\underline{T}_{xy.z}$.)

A further Kendall Partial Rank Correlation was carried out, between age and homonym scores, holding role-taking constant. This time, a smaller correlation was found ($\underline{T}_{xy.z}$ = +.18, N=26). Since there is a fairly substantial difference between this correlation and that for age and homonym scores ($\underline{T}$ = +.25), we conclude that the relation between age and homonym scores <u>is</u> dependent on role-taking.

To summarize, a strong association existed between the ability to detect lexical ambiguity as it was reflected in the children's scores on the homonym task, and the ability to adopt another person's perspective as it was measured by the role-taking task, that was not dependent on age.

Qualitative Analysis

The explanations given by the children to justify their responses will be discussed in terms of four different groups. Three of these groups are accounted for in the quantitative analysis which showed a strong positive correlation between scores on the homonym task and those on the role-taking task. The other group of children are exceptions to this trend.[1]

Group 1. This group consisted of children who scored poorly on both the homonym and the role-taking

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[1] Another exception was the one child who did well on the role-taking task but poorly on the homonym task. His case is dealt with on page 145.

tasks. ("Poorly" refers to scores between 11 and 18 on the homonym task and between 0 and 3 on the role-taking task.)

Group 2. This group consisted of children who scored poorly on the role-taking task (below 3) but well on the homonym task (over 21). This was the group whose scores take exception to the correlation.

Group 3. This group consisted of children who scored in the mid-range on both tasks .

Group 4. The children in this group scored highly on both the homonym (above 22) and the role-taking (above 8) tasks.

The question is whether this grouping is further justified by a consideration of the kinds of explanations offered by the children. Will these distinguish each group from the other, and yet be representative of the group itself? The descriptions that follow argue for a positive answer to this question.

Group 1 (poor scores on both tasks)

It was common amongst the children who scored very poorly on the role-taking task to give "other" (see scoring sheet) responses, such as picking up the figure instead of leaving it lying flat. The same sort of response was evident in the homonym task - the children in this group would pick up the objects and play with them, or would pay little attention to the questions

being asked. They did not differentiate between distractor questions and object questions, and would often give irrelevant answers:

Experimenter:	Can this be used to bake with? (moose-distractor question)
Lynn (2;8):	Yes. (incorrect judgement)
Experimenter:	How would you bake with that?
Lynn:	(taps the toy moose on the table)
Experimenter:	Can this be planted? (wrapping paper-object question)
Chris (4;7):	Yes. (incorrect judgement)
Experimenter:	How can this be planted?
Chris:	Cause I got too many toys.
Experimenter:	Can this make electric things work? (sink plug - object question)
Shirley (3;10):	No. (correct judgement)
Experimenter:	Why not?
Shirley:	I'm gonna make a cake.

There were six children in this group.

Group 2 (poor role-taking scores but high homonym scores)

This group contained responses from children that were not predicted by the positive correlation between the two tasks. (The prediction is that scores on both tasks will be parallel - a high score on one suggests a high score on the other; a low score on role-taking predicts a comparable low score on the homonym task). The puzzle occurs in the fact that the children in this group scored well on the homonym task. In fact, these children gave different kinds of responses from those that will be described for group 4 children (who scored well on both tasks). For example, instead of giving correct justifications, they often gave only 'linguistic' responses, that could not be probed further:

Experimenter:	Can this be used to bake with? (flower)
Alison (4;7):	No. (correct judgement)
Experimenter:	Why not?
Alison:	Because it's a flower.
Experimenter:	But you just said that flour can be used to bake with.
Alison:	(No response)
Experimenter:	Can this be worn on feet? (rubber eraser)
Carol (4;1):	No. (correct judgement) Cause it's a rubber.
Experimenter:	Yes, but you just told me that a rubber can be worn on your feet.
Carol:	(No response)

A linguistic response was a fairly consistent kind of response for these children. However, it does not necessarily imply that they have grasped the incongruity involved. Occasionally, a child changed the name of the object, which possibly demonstrates the beginnings of an awareness of the incongruity:

Experimenter:	Can this be used to drink with? (field straw)
Jackie (3;10):	No. Because it's grass. (she previously had called it straw)
Experimenter:	Can this be used to rub out a mistake? (shoe rubber)
Susan (3;1):	No. (correct judgement)
Experimenter:	Why not?
Susan:	It's a slipper boot. (she called it a rubber before)

However, not too much weight can be given to this interpretaion as these were just isolated instances and for the most part, the children in this group were giving correct judgements without being able to adequately explain or justify them. A final example:

Experimenter:	Can water come through this? (smoking pipe)
Leslie (3;1):	No. (correct judgement)
Experimenter:	Why not?
Leslie:	Because it's a pipe.

Experimenter:	But you told me water can come through a pipe.
Leslie:	I didn't.

There were five children in this group.

Group 3 (transition)

This group was characterized by a lack of consistency in responses, both within and between individuals. Awareness of lexical ambiguity was sometimes demonstrated, in that the answer to the word question may have been remembered, which caused the object question to be answered incorrectly:

Experimenter:	Can this be worn on feet? (rubber eraser)
Graham (4;4):	It can draw this thing out.
Experimenter:	Yes, but can this be worn on feet?
Graham:	Yes. (incorrect judgement)
Experimenter:	How can you wear that on your feet?
Graham:	Cause it's a rubber.

Experimenter:	Can this be planted? (flour)
Mary (3;2):	(nods) (incorrect judgement)
Experimenter:	How would you plant this?
Mary:	It's flour an it goes in a garden.

Sometimes the explanations were irrelevant:

Experimenter:	Can this be used to bake with? (flower)
David (4;7):	Yes. (incorrect judgement)
Experimenter:	How can you bake with this?
David:	With a shovel.

At other times there was a mismatch between the judgement and the justification:

Experimenter:	Can these be drunk out of? (eye glasses)
Kate (2;10):	(nods) (an incorrect judgement)
Experimenter:	How can these be drunk out of?
Kate:	Put on. Eyes.

Experimenter:	Can this be used to make a mark on paper? (toy moose - distractor)

Anne (4;5):	No. (correct judgement)
Experimenter:	Why not?
Anne:	Because you have to put it in paint, an put it on the paper an make footprints.

Answers were sometimes changed:

Experimenter:	Can this be used to make lights work? (sink plug)
Kim (3;10):	Yes. (incorrect judgement)
Experimenter:	How can this be used to make lights work?
Kim:	I don't know.
Experimenter:	Can this be used to make lights work?
Kim:	No. (correct judgement) It's a plug.

A couple of children seemed to "cotton-on", and then lost it. One girl detected the incongruity on the very last item:

Experimenter:	Can a rubber be used to rub out a mistake? (word question)
Tara (4;5):	Yes. (correct judgement) But not a shoe rubber.
Experimenter:	Not this? (shoe rubber - object question)
Tara:	No. (correct judgement)
Experimenter:	Why not?
Tara:	Cause it's for wearing.

"Pro-functional" responses were sometimes offered:

Experimenter:	Can this be used to stop up a sink? (electric plug)
John (3;2):	No. (correct judgement)
Experimenter:	Why not?
John:	It's for lights. (finds a function to describe the object)
Experimenter:	Can this be used to drink with? (field straw)
Tara (4;5):	No! (correct judgement)
Experimenter:	Why not?
Tara:	Cause it's for makin scarecrows.

A question was sometimes taken as a literal invitation to try and manipulate the objects, thus indicating a lack of awareness of lexical ambiguity:

Experimenter:	Can this be used to make music? (animal horn)

David (4;7): Yeah. (incorrect judgement) Watch me. (tries to blow and then sings)

Experimenter: Can this be worn on feet? (rubber eraser)
Mary (3;2): Yes. (incorrect judgement) (tries to put it on her foot)
Experimenter: Can this be worn on feet?
Mary: Yes.
Experimenter: And what's this?
Mary: A lubber.

Finally, sometimes further attempts at probing would yield no response (as often happened with group 2 children):

Experimenter: Can this be used to make a mark on paper? (postage stamp)
Chad (4;7): No. (correct judgement) It's a stamp!
Experimenter: You told me a stamp could make a mark on paper.
Chad: (no response)

There were nine children in this group. Basically, their responses can be summed up as demonstrating 'some awareness, some of the time'.

Group 4 (high scores on both tasks)

With one exception, children in this group tended to give the most adult-like explanations for their judgements. (It should be said that the basis for attributing a response as adult-like stemmed from the justifications four adults gave when they were tested on this task.) For example:

Experimenter: Can these be drunk out of? (eye glasses)
Nancy (4;7): No. (correct judgement)
Experimenter: Why not?
Nancy: Cause they're <u>glasses</u>.
Experimenter: But you told me glasses can be drunk out of.
Nancy: No. Just the other kind. I thought

you meant these kind of glasses.
(points to drinking glasses)

This example also highlights another common trait of children's responses in this group - namely, that they respond to further probes:

Experimenter:	Can this be planted? (flour)
Richard (4;1):	No. (correct judgement) Flour in a bag.
Experimenter:	But you said flour could be planted.
Richard:	Yes.
Experimenter:	Can this be planted?
Richard:	No. Cause it's for making puddings. I've seen people using that.

The above example demonstrates what was classified as a "pro-functional" response (which sometimes occurred in the responses of children in group 3), and is one that the adults frequently gave. Another response was what was categorized as a "con-functional" explanation, which simply meant that instead of stating what the object **could** do (as in a pro-functional response), children stated what the object **lacked** in reference to the question:

Experimenter:	Can this be read? (wrapping paper)
Kurt (3;7):	No. (correct judgement) Cause that paper's no writing on it.

Children in this group also distinguished between the distractor questions and the other questions, showing that they were aware that the task was really about ambiguity:

Experimenter:	Can this be drunk out of? (toy truck)
Kurt (3;7):	No! (correct judgement)
Experimenter:	Why not?
Kurt:	Cause it's a truck! (laughs loudly)

The kind of justification used (be it pro-functional, con-functional, or linguistic), tended to be consistently

given by each child. The criterion for consistency was that at least 80% of each child's justifications had to be of one type. There were five children in this group, which can be described as one containing linguistically aware and socially sensitive children.

What this qualitative analysis has demonstrated is that the homonym task itself, so far as it measures behaviour that indicates an awareness of lexical ambiguity, is fairly robust. It was quite apparent that, with one exception, the children in Group 4 knew exactly what the task was about and that Group 1 children obviously did not. This was reflected not only in their justifications (although the justifications confirmed it), but also in their total **quantitative** scores.

Individual Exceptions

There were three children whose responses were exceptions to the groups just discussed. One child, from Group 4 (Kelly), did not appear to grasp the ambiguities involved - her high score on the homonym task might have been due to a perseveration of "yes" responses to the word questions, and "no" responses to the object questions. It was difficult to tell if this in fact was the case, because her justifications were always "Cause I can't". Perhaps she was picking up non-verbal signals from the experimenter, and if this was so, it would explain why she scored so highly on the role-taking task.

It is also possible that she recognized the incongruities but was not linguistically capable of explaining them - this child was only 2;11.

Another exception concerned a child who scored well on the role-taking task, but poorly on the homonym task. However, the low homonym score was due to the fact that Derek did not cotton-on to the incongruities involved until more than half of the questions had been asked. After this point, his responses resembled those which were characteristic of Group 4 (the linguistically aware, socially sensitive group) responses:

Experimenter:	Can this be used to stop up a sink? (electric plug)
Derek (4;4):	No. (correct judgement)
Experimenter:	Why not?
Derek:	Cause it's a plug. (linguistic response)
Experimenter:	But you just said a plug could be used to stop up a sink.
Derek:	That one's a go in a socket. (pro-functional response)

The third individual exception involved a child called Chris. Although he fits well into the characterization of his group (Group 1), he was notable because of his advanced age (4;7).

Word Question - Object Question Differences

We can now return to the explanation of why there was a significant difference between responses to word questions and responses to object questions (T = 62, N=23, p = .02). Generally, children were more likely to

score correctly on the word questions (a "yes" response) than they were to judge the object questions correctly (a "no" response). Word questions were straight forward. The object questions were semantically anomalous, and as such, were more difficult for the children. Our explanation is that the presence of the objects added context to the questions being asked, and served to highlight the incongruities involved, which caused the children to reflect upon their previous judgements (of the word questions), and thus threw a little uncertainty into the air. Hughes and Grieve (1980) have demonstrated that children are more than willing to answer questions that adults pose, even questions that they do not understand. We feel that the objects added appropriate context to the questions. If this was the case, then the presence of the objects helped achieve our aim, which was to see if a task could be created that would help children to express an awareness of lexical ambiguity.

DISCUSSION

Returning to the original hypotheses that were proposed in the introduction to this investigation, it can now be stated that all four were supported.

1. The present results have shown that some preschool children can be shown to have the capacity to dissociate a word from its referent, and further, they can resolve an incongruity that exists when a given word has more than one meaning. If a criterion is set which demands that a correct judgement be accompanied by a correct

explanation at least 64 percent of the time, then it can be stated that 11 of the 26 children who participated in this study met the criterion - they were able to treat language as an object. This figure could be made even higher if the criterion was lowered. For example, if we accept the claim of Karmiloff-Smith (1979) that:

> "once the child becomes aware of one expression fulfilling two different functions, there is a tendency to create temporarily a new form to cover one of the two functions, retaining the original form for the other " (page 239)

then we might say that a few more children gave responses which are expressions of linguistic awareness, namely those children in Group 2 who changed the name of the homonym object ("because it's grass").

2. It has been demonstrated that the expression of linguistic awareness is not an all-or-none affair. The ranking of Groups 1 through 4 reflects a qualitative increase in the capacity to recognize lexical ambiguity. The group said to be in transition (Group 3) in particular shows this to be the case. The wide variety of responses from the children in this group included response types from groups both before and after it. The children in Group 1 were "out- of - awareness" - it is possible that for these children both representations of the word are kept separate. It is proposed that the group differences exhibited actually reflect a developmental trend of the manifestation of an awareness of ambiguity. What other areas of linguistic awareness this might extend to is a matter for future research.

3. A most interesting result emerged from this investigation, namely, that awareness of lexical ambiguity was related to another kind of awareness - that of "social other", as it was measured here through a role-taking task. Those children who were able to treat language as an object were also able to treat themselves as objects. Which came first is a difficult problem to unravel and has not been solved in this study. What can be stated is that social sensitivity seems to be a better predictor of linguistic awareness than is age.

4. We do not dismiss the effects of age entirely, for it was also demonstrated that awareness of both lexical ambiguity and another person's perspective increase as age increases.

The results also showed that this test is appropriate for young children in a way that both traditional word-referent tasks and riddle tasks are not.

CONCLUSIONS

This investigation has demonstrated that devising a task that is appropriate to young children will better reflect their capabilities. Some of the children in this study demonstrated a capacity for linguistic reflection at an earlier age than other researchers would give them credit for. New light is thrown on the theorizing that suggests that linguistic awareness will not emerge before a child enters school.

PAIRING OBJECTS BY NAME: THE SECOND HOMONYM EXPERIMENT

Introduction

This experiment developed out of the first homonym experiment. It represents an attempt to explore further young children's ability to recognize lexical ambiguity, and to deal with the confounding that occurred in the first experiment between the ability to explain and the ability to recognize lexical ambiguity. Another unresolved issue was whether it could be said that the children in categories 2 (poor role-taking scores, high homonym scores) and 3 (transition) possessed the **concept** of lexical ambiguity. Donaldson (1976) has defined the process of **conceptualizing** as "the process of constructing complex representations of the world and using these representations for the purpose of directing behaviour". The present experiment was devised to provide a way of helping children to construct for themselves a representation of lexical ambiguity, by "learning" how to pair objects having the same-sounding name. If a child could manipulate numerous homonym objects in such a way, it would show that the concept of this kind of lexical ambiguity was present. If the child could also explain why the objects were paired this way, it would overcome Donaldson's (1976) concern that consciousness should accompany conceptualization.

The experiment was divided into two testing sessions. The first session asked the child to combine the objects into groups of two according to any classification that the child wanted. Because, according to Clark (1977), the commonest basis for overextension in language acquisition appeared to be some shared property of shape, it was hypothesized that children in the present study might choose to pair objects on the same basis (for example, pairing the music horn with the smoking pipe as they both had about the same shape). The other predictions also stemming from the acquisition literature were that children might pair objects according to size (the finger nail and the postage stamp, for example) or texture (for example, the metal pipe and the metal nail).

The second session tested cognitive flexibility to the extent that the child's task was to put aside the previous classification strategy and consider a different way of classifying the objects. This ability to re-sort would indicate the beginning of what Lunzer (1973) called the growth of the awareness of the criteria that are used to guide one's actions.

METHOD

Subjects

The subjects were 23 monolingual English-speaking children who attended a nursery school in

Edinburgh. (The original group contained 29 children, but five had to be eliminated from testing because their native language was not English and one child was absent for the second testing and so was not included in the analyses). The group comprised 13 girls and 10 boys, whose ages ranged from 3;0 to 4;8.

Materials

Part A. The twenty-two objects that were used in the first homonym experiment were also used in the present study. (These consisted of 11 pairs of objects, of which each pair shared the same-sounding name). The paper dolls employed previously in the role-taking task were again used.

Part B. A small board was constructed which had both a bell and a buzzer attached to a battery, and which the experimenter could activate by pressing either the switch leading to the bell /ding-dong/ or the switch leading to the buzzer /zzzzz/. The board was hidden from view beneath the table. A small tray was placed on the table in front of the child.

Procedure

The two testing sessions were conducted over the period of a week.

Part A. On the first day, a child was selected at random from the nursery and taken to a separate room

within the school building. All twenty-two objects were randomly spread out on one of the two small tables in the room. Both the experimenter and the child sat a table. The child had two tasks to complete - the order of presentation of each task changed per child. The role-taking task was administered in the same way as in the first homonym experiment. The child's job in the second task, the spontaneous pairing task, was to put the array of objects into pairs. The instructions were:

"Do you see all of these things? Well each one of these things goes with something else here. Each of these things goes with another thing. All you have to do is give me two things that go together. Hand me two things that go together - two things that match".

As the child handed the experimenter a pair of objects, the experimenter asked why the child thought the two objects went together and probed for further explanation as much as possible. The combination of objects as well as the justifications given by the children were easily recorded by the experimenter on a scoring sheet constructed on the basis of pilot testing done in another nursery. (Appendix G contains a scoring sheet). Although pilot testing suggested that the children would have no difficulty naming the objects, this was verified with each child. In addition, all sessions were tape recorded using a Sony audio cassette recorder and later transcribed.

Part B. For the second session each child was again brought into the testing room. The child sat at a

table on which a tray, surrounded by the array of objects, was located. The experimenter sat on the opposite side of the table, with the bell-and-buzzer board on her lap. The instructions for this session were:

"Do you remember what you did in here before? You put these things in groups of two. Each of these things went with something else. Now today I want you to do exactly the same thing, only this time I want to see if you can put them together **my** way. I've got a special way of putting them together. And I'm going to help you find out what my way is, alright? I'll give you a hint." The experimenter put an object (the drinking straw, for example) on the tray and then searched for "something to go with" it. A series of incorrect objects were placed on the tray by the experimenter, causing the buzzer to sound with each incorrect placement. "Every time you hear that /zzzz/ sound, it means it's no good. The two things don't go together. So take it off and try something else". The correct object (in this case, the field straw) was then placed on the tray, and the bell sounded. "Hey! That means those two things go together. Every time you hear /ding dong/ it means you got it right - those two things go together. Do you know why those two things go together? It's because they're both called (straw). They both have the same name! Now you try it. Put something on the tray."

The objects used in the demonstration varied with each child and were put back amongst the others on the table. The instructions were repeated as necessary until it was evident that the children understood what they had to do. For the most part, the children quickly learned the meanings associated with the bell and the buzzer and, in fact, seemed to enjoy having this kind of feedback.

Scoring

Part A. Each child's pair combinations were categorized, and a percentage calculated - based on the

number of combinations per category out of the total number of pairings which were attempted. The categories included:

1. No justifications

a) **Adjacency.** The pair consisted of two objects which had been located side-by-side on the table. Usually no justification could be given for the combination, or else the justification was simply "cause they do".

b) **Random.** This category was similar to adjacency except that the two objects had not been beside each other but appeared to be picked at random. Again, no justifications were usually given.

2. Justifications

a) **Function (absent).** The object pairings in this category were "justified" according to absent objects that could be paired with each in a functional sense. (For example, Steven handed the experimenter the eye glasses and the sink plug. Experimenter: "Why do these two things go together?" Steven: "Um. That needs a lady an. Um. This needs a sink".)

b) **Function.** This category included responses of children who took the instructions as a literal invitation to put together two objects. (For example, Renato picked up the knitting needle and the bag of flour - and poked the needle through the bag. Experimenter: "Why do those things go together?" Renato: "Make hole on the flours".) It also included responses based on

possible functions of the objects. (For example, Louise handed the experimenter the shoe rubber and the eye glasses. When asked why they went together, Louise responded "cause....they want to put something on."

c) **Colour.** The objects were paired on the basis of colour.

d) **Shape or Size.** Pairs were constructed on the basis of shape or size, and appropriately justified ("because they're small"). This category was the only one which had been previously predicted.

e) **Name.** Two objects with the same name were put together and the justification given.

The same scoring procedure for measuring role-taking ability as was used in the first homonym experiment was applied here. Thus, children who decentred on all trials and needed no prompting were given a score of 11; and those who moved the doll in relation to their own point of view and needed a lot of prompting were given a score of 0. (See Appendix F for a description of the complete range of scores.)

Part B. A criterion of four correct turns in a row was set to indicate that the child had "cottoned-on" to the task. A correct turn consisted of the placement of one object on the tray, followed by the placement of the object of the same name, at which point the bell would sound. When asked why the two objects went together, the child had to give the correct justification, namely, that they both had the same name.

Each child's score consisted of the number of trials it took to reach criterion, up to a maximum of 14 (when it could be safely said that the child did not grasp the nature of the task). Thus, a score of 2, for example, meant that during the first two turns, the buzzer had sounded, but that the next four turns were correct. Similarly, a score of 8 indicated that the eighth trial was the last incorrect one before four consecutive correct trials.

RESULTS AND DISCUSSION

Part A. The results of the spontaneous pairing task are presented in Table 16. The children's ages from oldest to youngest are located in the left-hand column. It is interesting that the type of combination strategy adopted by the children is free from age restraints. That is, a number of younger and older children were unable to give justifications for their pairings and adopted the easiest strategy - that of combining two objects adjacent to each other. In addition, those children who combined the objects by using different strategies and who tried to explain their combinations were similarly of all ages.

There tended to be a perseveration of response strategies: 15 out of the 21 children (71%) who attempted the task employed just one strategy for 60% or more of their pairings. This perseveration was not

Table 16. Percentages of responses in the spontaneous pairing task.

Child	Age months	No justifications		Justifications				
		Adjacent	Random	Function Abs	Function Pro	Colour	Shape Size	Name
Shelley	56	82	18					
Patrick	56	100						
Melissa	55	80			20			
Kelly	55							100
Kyle	53	100						
Derek	51	45	11	22	22			
Olivia	51					11		88
Christa	50	100						
Vickie	50	36	64					
Daniel	47	100						
Nicole	47	60			40			
Jake	46				70	10	20	
Graham	45	56				22		22
John	45		11			56	22	11
Elizabeth	44	38	50				12	
Catherine	43		27	9		36	27	
Glen	42	would not do task						
Theresa	42	67	33					
Barbara	38	40	50					10
Chris	37		100					
Lorraine	37	100						
Valerie	36	did only one pair						
Paul	36			75	13		12	

Table 17. Percentage of children who adopted one strategy for 60 percent or more of their pairings.*

Adjacent	Random	Function Absent	Function Pro	Name
43 %	10 %	5 %	5 %	10 %

* The remaining 29 percent divided their responses among the categories.

confined to just responses categorized as adjacency, although it was the most common strategy used. The remaining children varied their strategies for grouping the objects into pairs (see Table 17). It is interesting to note that a few children actually combined the objects on the basis of name.

In general, the results of the spontaneous pairing task showed that half of the group (11 children), regardless of age, used the adjacency or the random pairing strategy and did not (could not?) offer justifications for the pairings. The other half of the group (ignoring for the moment the two children who did not do the task) adopted a variety of strategies, pairing the objects according to function, colour, size or shape and name. These children tried to give justifications for their combinations.

The next step was to see whether these children could change their initial strategies for pairing the objects, by learning a new way of combining them, and further, to see whether this learning was related to the ability to decentre. Thus the results of the role-taking task will be presented in combination with the results of Part B, the bell-and-buzzer task.

Part B. Scores on the bell-and-buzzer task are presented in Table 18, along with each child's score on the role-taking task. A low score on the homonym pairing task indicates that the child grasped the nature of the

Table 18. Children's scores on the bell-and-buzzer and the role-taking tasks.

Child	Age months	Bell-and-Buzzer	Role-Taking
Shelley	56	5	10
Patrick	56	5	8
Melissa	55	8	3
Kelly	55	1	10
Kyle	53	5	2
Derek	51	14	2
Olivia	51	0	11
Christa	50	14	2
Vickie	50	4	11
Daniel	47	14	0
Nicole	47	5	2
Jake	46	3	2
Graham	45	6	3
John	45	3	8
Elizabeth	44	8	8
Catherine	43	13	2
Glen	42	14	2
Theresa	42	14	7
Barbara	38	14	5
Chris	37	9	0
Lorraine	37	8	8
Valerie	36	7	3
Paul	36	8	7

task very quickly; a high score indicates a lack of comprehension. The role-taking scores are the reverse - that is, a high score indicates a good ability to decentre, while a low score indicates an inability to take into consideration another's perspective.

A Mann-Whitney U test was calculated on the bell-and-buzzer scores to test for possible sex differences. The results were not significant ($U=62$, $n_1=10$, $n_2=13$, $p > .10$), meaning that no difference existed between the boys' scores and the girls' scores. In fact, a cursory glance at the mean scores showed that no sex difference should exist (Boys: $M=8.1$, $N=10$, $SD=4.48$; Girls: $M=7.8$, $N=13$, $SD=4.83$).

The majority of the children who participated in the present study (17 out of 23, or 74%) demonstrated that they had "cottoned-on" to what the bell-and-buzzer task was about, and furthermore were able to justify their pairings according to the name of each pair. For example:

Paul (3;0): (has placed both papers on the tray)
Experimenter: Why do those two go together?
Paul: Cause that one's paper an that one's paper.

Lorraine (3;1): (has placed both plugs on the tray)
Experimenter: Why do those two go together?
Lorraine: Well these two plugs.

Melissa (4;7): (has placed both needles on the tray)
Experimenter: Why do those go together?
Melissa: Cause they are two needles.

Only six children did not reach criterion on the bell-and-buzzer task. Two of these had previously

adopted various strategies for combining the objects. The child who would not do the task on the first day could not (but he did try to) do the homonym pairing task. The other three children who did not reach criterion were among those who had previously grouped the objects by using the adjacency strategy. (This meant that the other eight children who had used adjacency and random strategies did reach criterion!)

A series of Kendall Rank Correlation Coefficients and Partial Rank Correlation Coefficients were calculated to determine the relation between scores on the homonym pairing task, scores on the role-taking task and age.

The correlation between age and role-taking scores was not significant ($T = +.147$, $p > .05$). This indicated that the ability to decentre was not dependent upon age. There was a significant correlation between age and scores on the bell-and-buzzer task ($T = -.273$, $p < .05$). The younger the age was of a child, the greater was the corresponding score on the homonym pairing task. In other words, the younger children had more difficulty combining pairs of homonym objects according to their names than did the older children.

The largest correlation was found between scores on the bell-and-buzzer task and scores on the role-taking task ($T = -.433$, $p < .002$). Those children who performed well on the homonym pairing task, were

those who were also able to adopt another person's perspective in the role-taking task. A partial rank correlation coefficient between these two scores, holding age constant was calculated to determine just how strong the relationship was. The resulting large coefficient ($T_{xy.z}$ = -.412) provided evidence that the relation between the ability to combine pairs of homonyms and the ability to decentre is relatively independent of the influence of age (because -.412 is not much smaller than -.433). These results support those of the first homonym experiment, where a strong relationship existed between the ability to adopt another point of view and the manifestation of the awareness of linguistic ambiguity (the ability to suspend the influence of a particular context), that was relatively independent of the age factor.

CONCLUSIONS

Of the 23 children who participated in this experiment, 17 demonstrated cognitive flexibility to the extent that they were able to disregard their initial classification criteria for pairing the homonym objects and re-classify the objects according to a different criterion. Furthermore, these children were able to explain that the objects went together ("cause they're both nails!", "It's cause that's a rubber an that's a rubber", "cause they're both called stamps") - a demonstration of behaviour that manifests the awareness

of lexical ambiguity.[1] Thus the confounding which seemed to occur in the first homonym experiment of the growing capacity to reflect on language with the growing ability to explain verbally has virtually been eliminated with the use of the bell-and-buzzer technique.

The other point to be made, however, is not so much that the ability to explain is present (because two children who did not reach criterion could nevertheless offer justifications), but that this expression of the awareness of linguistic ambiguity is related to a parallel awareness of another's point of view as was measured by the role-taking task.

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[1] Both **Kelly** and Olivia originally classified the objects according to name. They were therefore asked to put them together in another way so as to ensure cognitive flexibility. **Kelly** chose to re-classify the objects mainly by colour; Olivia used function (drinking straw with drinking glasses).

CHAPTER 4: CHILDREN'S AWARENESS OF THE WORD AS A UNIT OF LANGUAGE

BACKGROUND RESEARCH: AWARENESS OF WORDS

At the beginning of chapter three, Bowey and Tunmer's (1980) three criteria for demonstrating word awareness were listed. It will be recalled that the awareness of the word as a unit of language logically preceded the awareness of the arbitrary nature of words, which in turn preceded (but not logically) the comprehension of the word **word**. It is the first of these components that we will now discuss.

Most investigations dealing with the awareness of the word as a unit of language have asked children to segment spoken sequences into their constituent words. For example, in studies conducted by Karpova (1955, 1966), Russian children aged between three and seven years were required to repeat sentences and then to respond to the questions "How many words are there?" and "Which is the first word? Which word is second? Which is the third word?" Not surprisingly, the children had great difficulty in correctly answering the questions. Performance did increase with age, but even the oldest children made errors with prepositions and conjunctions. Karpova (1955) hypothesized that the younger children used the sentences as unified wholes. This developmental trend of results was also observed on English-speaking

children (Hall, 1976) and French-speaking children (Berthoud-Papandropoulou, 1978; Papandropoulou and Sinclair, 1974).

Other studies have tried to overcome the problem of using the word **word** through the use of corrective feedback and practice trials. A commonly used procedure is to ask children to first listen to a spoken sequence, and then tap or put out a token for each word of the sequence. For example, the procedure used by McNinch (1974) and **also** by Kingston, Weaver and Figa (1972) required subjects to place the number of wooden cubes in front of the experimenter that corresponded to the number of words in the sentences presented orally (by the experimenter and by a tape recorder) to the subjects. Both studies reported that children in grade 1 performed at only the 50 percent level. The number of words was consistently underestimated by the first graders. Evans, Taylor and Blum (1979) also reported similar findings for this age group. Holden and MacGinitie (1972) asked children to repeat an utterance while tapping a separate poker chip for each word. They found that kindergarten children (mean age was 5;11) were much better at isolating words with lexical meaning than they were at isolating function words, a finding that was replicated by Ehri (1975).

We revised the Holden and MacGinitie (1972) talking and tapping procedure, and administered it to the

two-year-old children who participated in the longitudinal study. These children were asked to drop one small wooden block into a plastic bucket for each word in a given sentence. (Although the word **word** was used in the instructions, it was felt that the demonstration would help the child to realize that what was being asked was segmentation - and it was the aim of this exercise to see how the children would choose to segment the sentences (by noun phrase, by syllable, by word, by idiom?) The stimulus sentences consisted of a selection of the children's own utterances which had been taken from the previous session's recording. Utterances were chosen which contained all one-syllable words; one- and two-syllable words; and one-, two- and three-syllable words. The instructions were as follows:

"These are very special blocks. They are word blocks. Each block stands for one word. Now, what we're going to do is drop one block into the bucket for each word that you say. Do you want to see how it's done? Okay. Can you say "elephants live in the zoo"? (child replies) Good. Now watch. Watch the word blocks. You put one in the bucket for each word. Elephants (drop) live (drop) in (drop) the (drop) zoo (drop). Can you do that? One block for each word you say."

Two of the children refused to try the task at all. The remaining eight were willing to drop the blocks into the bucket, but rather than segmenting the sentence, they would generally put one or all the blocks in at the same time for the entire expression:

Experimenter:	Try "Daddy's gone to school".
Richard (2;5):	(drops in one block)
Experimenter:	Richard say it.
Richard:	Daddy's gone to school (drop).

Experimenter:	Sit down. Can you say that with the blocks?
Sarah (2;3):	Sit down (drop).
Experimenter:	Great. Say it again.
Sarah:	One (drop) three four (drop) five six (drop).
Experimenter:	No. Sit down.
Sarah:	Sit down (drop).
Experimenter:	Put (drop) wellies (drop) on (drop).
Scott (2;2):	Put wellies on (drop).
Experimenter:	Tracy, watch. I (drop) don't (drop) tear (drop) books (drop).
Tracy (2;1):	Go way (drop). Go way (drop). Go way (drop).
Experimenter:	Where (drop) has (drop) Spice (drop) gone (drop)?
Caroline (2;1):	Where has Spice gone?
Experimenter:	Do it with the blocks. Where ...
Caroline:	Spice gone (drop). Don't want to do it with the blocks. Put them in the box (drop). One in the box (drop). Two in the box (drop) (drop).

It can be seen from the examples given above that the children had difficulties in segmenting the utterances. It was felt that this task, which involved analysing the sound stream into its word constituents was too difficult for these two-year-olds. It could well have been that the children could not cotton-on to the task because they did not understand the meaning of the word **word**, regardless of the sample demonstration. Perhaps explicit feedback could have helped the children to segment, but the purpose of the task at that time was to see what units of segmentation the children would use.

Fortunately, other researchers did take these problems into consideration. Tunmer and Bowey (1980, b) not only took particular care to ensure that children's performance on the word tapping task was not confounded

with their knowledge of the term **word**, but they also shortened the word strings so that memory, or lack of it, could not be a factor either. Their pre-test procedures incorporated corrective feedback and explicit demonstration. Notably, they found that even four-year-olds could segment 73 percent of short word strings correctly. Five- and six-year olds performed with 90 percent and 98 percent accuracy respectively.

Using similar procedures which involved corrective feedback of practice items and limiting the length of test items, Tunmer, Bowey and Grieve (1983) demonstrated (in the first three of a series of five experiments) that children as young as four years of age could successfully segment a spoken string (by talking and tapping) into its word constituents. In fact, over half of the forty-eight four-year-old subjects who participated in the experiments scored above ninety percent correct. However, these results were tempered by the results of two subsequent experiments, which indicated that four- and five-year old children may have been responding on the basis of acoustic stress. This was particularly true in Tunmer, Bowey and Grieve's (1983) fifth experiment, which asked children aged between four and seven to tap to a variety of word strings that varied with regard to string length (two words vs. three words), noun type (compound vs. noncompound) and initial functor type (stressed vs. unstressed). In a qualitative analysis of the children's

responses, Tunmer, Bowey and Grieve (1983) detected five types of segmentation strategies: phrase, syllable, stress, morpheme and word. The phrase strategy (one tap for an expression like "his toenail") was only observed in the responses of the five-year-old children. In addition, the stress strategy accounted for 26.7 percent of the five-year-old responses to strings like "a peanut" which contain an unstressed functor and a double-stressed compound word. Tunmer, Bowey and Grieve (1983) summarized these findings as follows:

> "The general picture that emerges from the data, then, is that most 5-year-olds and a few 6- and 7-year-olds do not segment meaningful syntactic phrases into their constituent words in the present studies." (page 591)

There have also been studies that instead of asking children to segment a spoken sequence into its constituent words, have asked children to segment the sound stream into still smaller units, namely, phonological units. The research has shown that this is a difficult task for young children. Bruce (1964) asked children aged between five and seven to say what word would be left if a particular sound (the first, middle or last sound) were to be taken away from the test word. He concluded that children with mental ages below seven years could not phonemically analyse words. Zhurova (1973) devised a game for her Russian preschoolers where the children had to give just the first sound in the name of an animal. She found that it was not until the age of five or six that children could do this readily. When

the analysis task was simplified, younger children were capable of performing: Fox and Routh (1975) asked children to repeat smaller and smaller "bits" of sentences spoken by the experimenter, and demonstrated some success on this task from children as young as three years of age. Wallach, Wallach, Dozier and Kaplan (1977) reported that kindergarten children could recognize that a word begins with a given sound. Rosner and Simon (1971) devised a series of analysis tasks with predicted levels of difficulty. First-grade children (six years of age) were able to omit the initial and final consonants of a one-syllable word (**b** - el - **t**), but could not omit the middle sounds, and they also performed poorly on the other analysis tasks.

There have been few comparable systematic investigations of children's abilities to construct words from initial sounds, but the acquisition literature suggests that such constructing is a natural process of language learning.

We played a game of "I spy" with our two-year-old children, in an attempt to see if they could construct a word from a given phoneme. The experimenter would say "I spy with my little eye, something that begins with / /". The mother and the experimenter would demonstrate, and then the experimenter asked the child to play the game. Six of the eight children who participated were willing to play the game, but they did

not seem to cotton-on:

Experimenter:	I spy with my little eye, something that begins with /h/.
Tracy (2;8):	Chair.
Experimenter:	/h/
Tracy:	The paper.
Experimenter:	/h/
Tracy:	Eyes.
Experimenter:	/h/ head.
Tracy:	Head. Chin.
Mother:	I spy with my little eye, something that begins with /t/.
Susan (2;10):	Hmmm. /t/ Hmmm.
Mother:	/t/ for ... What do you watch?
Susan:	Play school.
Mother:	What do you watch playschool on?
Susan:	What? What is it? Switch it on.
Mother:	What about /t/ - television?
Susan:	Television!

However, two of the children did seem to catch on to the task:

Experimenter:	I spy with my little eye, something that begins with /k/.
Richard (2;6):	(pause)
Experimenter:	/k/ for ...
Richard:	Car! /k/ - car.
Experimenter:	I spy with my little eye, something that begins with /t/.
Caroline (2;1):	Table.
Experimenter:	I spy with my little eye, something that begins with /w/.
Caroline:	William.

These two children were not accurate 100 percent of the time, but there were strong indications that they both could construct a word from a given initial sound.

We then thought that perhaps one of the reasons for the relative lack of success (meaning that very few children seemed to grasp the nature of the tasks) with both the analysis (word blocks) and construction (I spy) games, was that the games were too abstract for these

youngsters. Was there a way we could construct a context that would make things appear more relevant to the children? Instead of sounds, we thought that words would make more sense to the children. And instead of having the children simply speak the words out loud, we brought along pictures of the word referents that they could also point to. There were two sets of pictures used in the following task:

"I am thinking of one of these pictures and I want you to guess which one I am thinking of. The picture that I'm thinking of is made up of two words. And if you put the two words together and say them very fast, you will get the picture I'm thinking of. For example, this is a picture of what? (child says "hair") And this is a? (child responds, "brush") So we've got hair (points to the picture of hair). Brush (points to the picture of a brush). Hair (points). Brush (points). Which picture over here am I thinking of then?"

Five of the eight children who participated in this game were able to point to at least two of the correct pictures. For example,

Julie (2;8):	A fish.
Experimenter:	And this word?
Julie:	A finger.
Experimenter:	So we've got (points to fish)
Julie:	Fish.
Experimenter:	(points to finger)
Julie:	Finger.
Experimenter:	Okay Julie. Find the picture.
Julie:	(points to the fishfinger picture)
Experimenter:	Yes. Cause what's that?
Julie:	Fishfinger. Fishfinger.
Experimenter:	(points to egg)
Caroline (2;7):	Egg.
Experimenter:	(points to cup)
Caroline:	Cup.
Experimenter:	Say it quickly.
Caroline:	Egg. Cup.
Experimenter:	So which one am I thinking of?
Caroline:	I don't see an eggcup. Where's the eggcup? I don't see it. I'm looking harder. No. I don't see - oh!

There's an eggcup!

This synthesis task of constructing a word from two other words proved to be much easier for the children to do than was the phoneme task which asked them to construct a word from just a sound. One of the reasons that this was so probably stems from the fact that in the compound word task there is semantic overlap between the compound word and at least one of its components.

At the very least, it was shown that some two-year-olds demonstrated that they could construct a word from two separate words, which at a fundamental level can be interpreted to mean that they had the ability to manipulate language at the level of the word.

In summary, the research to date of the study of children's awareness of words suggests that awareness of Bowey and Tunmer's (1980) first component, the awareness of the word as a unit of language, may be shown in children as young as four years of age (given the appropriate task, such as that used by Tunmer and Bowey, 1980, b). Some of our two-year-old children were also shown to be able to synthesize a word from two other words.

NURSERY CHILDREN'S ABILITY TO ANALYSE AND SYNTHESIZE COMPOUND WORDS

Introduction

There were two aims in designing this experiment. First, we wanted to test whether nursery school age children could demonstrate awareness of compound words - that is, could they show that a word can be made by combining two other words, or would a compound word simply have one referent in their minds? We wanted to alter the methodology of previous research, and improve on the methodology used with the two-year-old children, in creating a task appropriate to children between the ages of three and five years.

The second aim was to test a specific hypothesis: namely, that analysing a compound word into it constituents would prove more difficult for young children than would synthesizing two words into a new word. As far as auditory perception is concerned, it has been said that children have more difficulty analysing the sound stream into parts than they have in synthesizing it (Roberts, 1975). Our previous research with two-year-olds also suggested that a synthesis task (the compound word task) might prove easier than an analysis task (the word block task). We wanted to test this out more directly.

METHOD

Subjects

The subjects were twenty monolingual English-speaking children attending a nursery school in Edinburgh. Their ages ranged from 2;11 to 4;9. Two groups of ten children each were formed, matching as closely as was possible for age, sex and role-taking scores. The mean age of Group 1 was 4;1 and that of Group 2 was 4;0. There were 7 boys and 3 girls in Group 1; 6 boys and 4 girls in Group 2; and role-taking scores in each group ranged from 1 to 11.

Materials

Two test booklets were prepared - one for the synthesis part of the experiment and one for the analysis part. Pictures were cut out of magazines and pasted into two large scrapbooks. The synthesis scrapbook was set up as follows: two pictures, one for each of the two components of the target compound word, were pasted one above the other on the left-hand side of the first opened page. On the right-hand page were pasted four other pictures, one above the other. These four included pictures of: the target word, a possible semantic associate of the first component, a possible semantic associate of the second component and a distractor (usually a picture of a toy). For example, the first opened page had pictures of the following:

	toy car
butter	butterfly
fly	bread
	cricket

In this instance, car was the distractor item, butterfly was the target item, bread related semantically to butter and cricket related semantically to fly. The corresponding setup in the analysis scrapbook was:

	bread
	moth
butterfly	fly
	rocking horse
	butter

The pictures were different ones from those used in the synthesis scrapbook. In addition to the two target pictures and one distractor picture, were pictures of two semantic associates - one related to the compound word,

and one related to either the first or second constituent of the compound word. In this case, bread related semantically to butter (the first component of butterfly), moth related semantically to the compound word butterfly, fly was a target picture, rocking horse was a distractor and butter was the second target picture.

There **was** a total of thirteen compound words: butterfly, football, teapot, lipstick, icecream, sunglasses, rubberband, toothbrush, nutcracker, pineapple, fishfinger, strawberry and bowtie. The same words were used in both scrapbooks, but in different orders. Appendix H lists the pictures that went with each compound word.

Procedure

The children were chosen at random and tested individually in a small room located in the nursery school building. The experimenter sat on one side of a small table, facing the child who sat on the opposite side. For both tasks, the scrapbook was opened to the first page. A blank sheet of paper covered the pictures on the right-hand side, so that all that the child could see initially were the pictures on the left-hand side. The instructions for the synthesis task were as follows:

"You are going to look at some pictures in this game. First you'll tell me the names of two pictures, then you say the names one right after the other real quickly and you'll come up with a brand new name. For

example, this is a picture of what? (The child says the name.) Okay. Now remember that name. And this is a picture of what? (The child says the name of the second picture.) Now say those two names right after the other very quickly. (The experimenter pointed to one picture then the other.) That's your brand new name. What is it? (The child responds.) Okay. Now show me a picture of that brand new name. (The experimenter lifts up the blank sheet of paper and exposes the pictures on the right-hand side of the page.)"

The instructions for the analysis part were:

"I'm going to show you a picture and what you've got to do is tell me the name of the picture. Then say it very slowly and break the name up into two bits. Two different names. Okay? And then you've got to show me two pictures - one for each bit. For example, this is a picture of what? (The child says the name, e.g., toothbrush.) Now say it very slowly and we'll make it into two bits: tooth brush. (The child repeats, tooth brush.) Right. There are two new names. The first one is tooth and the second is brush. So what I want you to do here is show me two pictures. One for each name."

The experimenter marked the pictures each child pointed to on scoring sheets that had been designed on the basis of pilot testing. The marking was unobtrusive and did not affect the flow of the session. (See Appendix I for sample scoring sheets.) All sessions were recorded using an audio cassette recorder, and later transcribed.

Children in Group 1 were first given the synthesis part, and on another day, they did the analysis task. Group 2 children completed the analysis task first, followed by the synthesis task on another day. The role-taking task (Light, 1979) had been previously administered, and was one of the factors used in evenly dividing the children into two groups. This was the same task as had been administered in previous experiments.

Scoring

For the synthesis task, one point was awarded for each correct (target) picture pointed to. A half-point was given if another picture had initially been pointed to but was quickly retracted and changed to the target picture. No points were awarded for pointing to a picture other than the target, switching from the target to another picture or for pointing to more than two pictures. The maximum possible score was 12 (not 13 because the first compound word was done with the experimenter).

The scoring of the analysis task was essentially similar to that of the synthesis task, except that two target pictures had to be pointed out for a score of one. A half-point was awarded in those cases whereby one of the pictures pointed to was a target, but the other target was pointed to only after switching from another picture. These were the only conditions under which points were given. Again, each child's score was the number correct out of a possible 12.

RESULTS

It was first necessary to determine whether there were significant differences between Groups 1 and 2 on the synthesis and on the analysis tasks, because each group did the tasks in a different order. Such a

difference would indicate a learning effect that could have been transferred from the first testing session to the second session. This could actually go either way - having done the analysis task, a child might find it easier to do the synthesis task, or alternatively, might have difficulty switching to the new instructions.

Two Mann-Whitney U tests were performed; one comparing the two groups on the synthesis task and the other comparing them on the analysis task. Neither test was significant. For the synthesis task, $\underline{U} = 32.5$, $n_1=10$, $n_2=10$, $\underline{p} > .10$ and for the analysis task $\underline{U} = 54.5$, $n_1=10$, $n_2=10$, $\underline{p} > .10$. Thus there was no appreciable learning effect acting as either a help or a hindrance to those children who had received one task before the other.

These results enabled us to combine the groups and perform a Wilcoxon-matched-pairs-signed-ranks test on synthesis versus analysis scores, using every subject's two scores as the matched-pairs. Table 19 lists the ages, the role-taking scores and the synthesis and analysis scores of all the children. This procedure was a direct test of the hypothesis that the analysis task would be more difficult for the children to do than would the synthesis task. The results were highly significant ($\underline{T} = 0$, $N=19$, $\underline{z} = -3.82$, $\underline{p} < .001$). In no instance was there a negative difference; that is, all subjects scored higher on the synthesis task than on the analysis

Table 19. Individual scores on the compound word task.

Name	Age (Months)	Role-Taking	Synthesis	Analysis	Total
Jennifer	55	11	12.0	9.0	21.0
Tina	51	8	12.0	8.0	20.0
Matthew	57	2	12.0	8.0	20.0
Jason	51	8	10.5	7.5	18.0
Ian	52	2	10.0	8.0	18.0
Curtis	48	11	9.5	8.0	17.5
Greg	53	6	10.5	5.5	16.0
Gavin	55	11	9.5	6.0	15.5
Anna	54	5	9.0	6.5	15.5
Emily	56	11	8.0	6.0	14.0
Michael	53	8	8.5	3.5	12.0
George	56	7	10.5	1.5	12.0
Kirk	55	11	8.5	3.5	12.0
Eric	36	8	10.5	1.0	11.5
Alice	50	5	8.5	3.0	11.5
Brian	35	2	7.0	0.0	7.0
Sandra	39	1	5.0	1.0	6.0
William	36	5	4.0	1.0	5.0
Emma	36	5	2.5	0.5	3.0
Ken	41	1	1.0	1.0	2.0

task except for the one subject whose scores were the same on both tasks.

A series of Kendall's rank correlation coefficients were calculated in order to determine the relation between: scores on the compound word tasks and the ages of the children; scores on the compound word tasks and scores on the role-taking tasks; and role-taking abilities and age. The correlations of synthesis and analysis scores with age were significant (T = +.35, z = 2.14, $p < .02$ and T = +.46, z = 2.83, $p < .01$ respectively). Thus the older children were better able to do the tasks than were the younger children, and in particular, an increase in age indicated a comparable increase in scores on the analysis task, as this correlation was the highest. Another significant positive correlation was found between age and a total compound word score, which was the sum of scores from the two tasks (T = +.38, z = 2.37, $p < .01$). Again this suggests that the older children did better at the tasks than did the younger children.

But this is not the only picture to be painted, as another factor also correlates highly with the scores from the compound word tasks: the ability to decentre as it was measured by the role-taking task. There was a positive correlation between role-taking scores and synthesis scores (T = +.28, z = 1.70, $p < .05$), between role-taking scores and analysis scores (T = +.34,

z = 2.07, p < .02) as well as between role-taking scores and the total compound word scores (T = +.34, z = 2.10, p < .02).

There was also a significant positive correlation between age and role-taking scores (T = +.31, z = 1.93, p < .03). We therefore wanted to partial out the effects of age to determine if the relation between role-taking and the total compound word scores would still be strong. The partial correlation holding age constant was still quite high ($T_{xy.z}$ = +.25), indicating that the relationship between the awareness of compound words and the ability to role-take was relatively independent of the effects of age.

In sum, these results suggest that for nursery school children, it is more difficult to break compound words down into their constituents than it is to synthesize or "build-up" two words to form a new word. The fact that quite a few nursery children could do the tasks was an expression of an awareness of language, but this awareness went hand-in-hand with social awareness (or sensitivity) and to some extent, depended on age. The three are interdependent in the sense that older children were often more socially aware and also did better on the compound word tasks than did younger, less socially-aware children.

To assess how strong the attraction for semantically similar pictures might be, we looked at the

number of times the non-target pictures were pointed to and also at the explanations offered by the children as to why they selected a particular picture.

Synthesis

It was generally the case that if the child pointed to the target for at least six of the compound words, the child could be said to have cottoned-on to the task. For such children, any errors that may have been made, were done by pointing to semantically-similar pictures and never by pointing to distractors. Children with scores of less than six had difficulty grasping the nature of the task, and quite often were distracted by the distractor pictures. One child adopted the strategy of pointing to the bottom picture first, then one or more of the other pictures. In fact, an extremely easy way of separating the children who grasped the task from those who did not was simply to look at the distractors: any child who pointed out a distractor had difficulty with the task. There did not seem to be any preference for one semantic picture over the other. Pictures which were semantically related to the first component of the compound words were chosen equally as often as pictures which were semantically related to the second component. All the children were asked to explain why they had pointed to a particular picture, and those who could be said to have grasped the task would justify a target by calling it by its name ("cause it's a nutcracker!" or

"there's a fishfinger" or "that's the strawberry") children with scores between 1 and 6 had trouble explaining their choices. For example, William (whose score was 4) pointed to the distractor for the compound word icecream and said "pencils". When asked why he chose that picture, there was no response. Emma responded similarly: "Santa Claus!" or "tick tock" and could not explain why. Another response was simply "can't do".

Analysis

Although the scores on the analysis task were generally lower than those of the synthesis task, (they ranged between 0 and 9, with a mean score of 4.43) the children who eventually cottoned-on to the task were able to justify their choices correctly:

Experimenter:	What's this?
Ian (4;4):	A bowtie. The first bit's bow. An the second bit's tie! Bow (points to the picture of a bow) an a tie (points to the picture of a tie).

Prior to catching on, however, the most common strategy was to point to one of the target pictures, and then the picture that was semantically related to the compound word as a whole. Once again, children who scored poorly (between 0 and 3) always pointed to some distractor pictures. It seemed to be much harder for the children to pull away from the attraction of the semantically similar 'whole' picture than to break the

compound word into two very different pictures (for example, for "sunglasses", the picture of the pair of eyes were often chosen instead of pictures of the sun and the drinking glasses). One enterprising individual tried to solicit some help in searching for the right picture "I can't see one, can you?" but he obviously had not understood the instructions for the task as he mostly pointed to one picture, rather than two.

CONCLUSIONS

Children who scored less than 7 on the synthesis task, and less than 3.5 on the analysis task did not appear to have grasped what the tasks were about. The synthesis task was shown statistically to be the easier of the two tasks, and only four of the twenty children tested received scores of less than 7. These four also did not do well on the analysis task. In addition, four other children received low scores on the more difficult analysis task. It is interesting to note that all eight of these children also scored poorly on the role-taking task (scores ranged between 1 and 7), which indicated that children who did not behaviourally demonstrate an awareness of compound word also did not show an ability to decentre. The reverse, however, was not always true, in that all the children who scored poorly on the role-taking task did not necessarily score poorly on the compound word tasks. Another finding was that, with only one exception, nonegocentric children

(those who scored 11 out of 11 on the role-taking task) demonstrated an understanding about the nature of the compound word tasks. We have already shown that there is a strong positive relation between the awareness of "social other" as we have elsewhere called it and the behavioural manifestation of an awareness of compound words ($\underline{T}$ = +.34). Twelve of the 20 three-to-five-year-old children who participated in the present experiment were able to demonstrate by appropriate behaviour, an awareness of compound words. These results are consistent with those of the first homonym experiment. A picture is slowly being constructed which is sorting out the nature of the relationship between cognitive development and linguistic awareness.

This experiment also demonstrated that, in line with the results from the auditory perception literature, a task of analysing a compound word into two constituent words is a more difficult task for young children to do than is one that requires two words to be synthesized into another word.[1]

Finally, it was also shown that scores from the present task, which was designed to access children's ability to see the word as a unit of language, increased as the age of the children also increased.

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[1] It must also be stated, however, that the analysis task could be cognitively the more difficult of the two tasks; one reason being that the children were required to point out not one, but two pictures in order to receive a full point.

CHAPTER 5: CONCLUSIONS

SUMMARY OF RESULTS

In the introductory chapter of this thesis it was proposed that linguistic awareness, the ability to treat language as an object, would show a relation to other developmental abilitites - both cognitive and linguistic. The studies that followed were designed to tap into behavioural manifestations of word awareness in children aged between two and five years. The three aspects of word awareness under consideration were the awareness of word order, the awareness of the phonologically arbitrary nature of the word and the awareness of the word as a unit of language.

The studies in chapter 2 dealt with the first aspect - the awareness of word order. Starting with a replication of Gleitman, Gleitman and Shipley's (1972) role-modelling game with two-year-old children, a significant positive correlation was found between the number of judgements (about the syntactic acceptability of grammatical and ungrammatical word strings) offered by the children and their linguistic ability measured as the median number of syllables per utterance. The ability to make such judgements we interpret as a manifestation of another kind of ability - the ability to treat language as an object.

Approximately nine months later some of these same children were able to repeat grammatical, and correct ungrammatical simple imperatives that were ungrammatical by virtue of incorrect word order. This ability to correct for word order is again a manifestation of linguistic awareness. It is a capacity that cannot be "all-or-none", as the children were neither correct nor incorrect 100 percent of the time, just as their spontaneous speech was neither grammatical nor ungrammatical 100 percent of the time. The positive correlations between these behavioural indicators of linguistic awareness and linguistic ability at both time periods suggest that developmentally the two are related. This finding offers empirical support for the interaction hypothesis put forward by Smith and Tager-Flusberg (1982), which states that there is a relation between language development and linguistic awareness during the preschool years.

Nursery children aged between three and five years were then given the opportunity to judge correct or incorrect word order imperatives. A bell-and-buzzer board was used to indicate the children's responses. This task seemed to be quite appropriate for this age level, for not only did the children appear to be enjoying themselves, but a large number were quite accurate in their judgements. Further, these children made grammatical corrections of sentences judged to be ungrammatical with a frequency that was well above

chance. Insofar as we propose that linguistic awareness is the ability to treat language as an object, and that the ability can be embedded in a task of this nature, we believe the task as it has been devised is appropriate for nursery-aged children.

The studies described in chapter 3 explored children's awareness of the phonologically arbitrary nature of words. In the first homonym experiment, children were asked questions about a certain homonym, and then had to respond to the incongruity that was set up in the context of the presence of a homonym object of the other meaning. The children were also given a role-taking task which was designed to measure their ability to decentre. A strong positive correlation was shown to exist between scores on the homonym task and scores on the role-taking task, that was relatively independent of age. Our interpretation extends this relationship to the two kinds of awareness - one being the awareness of lexical ambiguity (the ability to suspend the influence of a particular context), and the other being the awareness of another's point of view. To take this one step further, it is proposed that a relation exists between linguistic awareness and cognitive development, to the extent that the children's responses to the tasks were manifestations of both.

The second homonym experiment asked the children to pair the homonym objects any way they chose,

and then to pair them according to name. The bell-and-buzzer board was used in the "learning" part - each time a child incorrectly paired two objects, a buzzer sounded, while each successful pairing elicited a bell sound. Seventy-four percent of the children who participated in this experiment learned to pair the homonym objects by same-sounding names. These children could be said to have the ability to suspend the influence of their initial classification criteria in order to be able to re-classify the objects according to a different criterion (name). Further, this ability correlated highly with the ability to adopt another person's perspective as it was again measured through the role-taking task.

The aspect of word awareness that was investigated in chapter 4 was children's awareness of the word as a unit of language. This was tested through a compound word task that required children to both synthesize (build up) and analyse (break down into components) a compound word. It was shown that nursery school children found it more difficult to analyse compound words than to construct a new word from two constituents. There were significant positive correlations found between analysis scores and role-taking scores; between synthesis scores and role-taking scores; and between total compound word scores and role-taking scores. These correlations indicated once again that a relation existed between

linguistic awareness and the ability to decentre.

DISCUSSION

The hypothesis that the expression of linguistic awareness is not an all-or-none affair is not trivial.[1] In fact it is an agreement with this hypothesis that lies at the core of much recent work on child language acquisition and cognitive development. After each visit with the two-year-olds (who were studied longitudinally), it was not the impression of this experimenter that the children were totally unable to demonstrate an ability to treat language as an object. On the contrary, a positive impression of what the children could do was the more common. However, this was matched with the frustration of realizing how much the tasks would have to be refined in order to reflect this subjective opinion. It was therefore quite satisfying to have obtained a relatively good range of responses from nursery school children on the tasks that

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[1] Although the expression "cottoned-on" which was used throughout this thesis seems to refer to a discrete jump into awareness, the hypothesis that the expression of linguistic awareness will not be all-or-none is still supported, as individually, the children still made mistakes in responding even after appearing to have grasped the nature of the task. The possibility is that in "cottoning-on" to a particular task, the children could be both making a discovery about the experiment and making a discovery about language itself.

were devised. Again, the fact that there was a range of responses indicates that the expression of linguistic awareness is not all-or-none. This extends also to the role-taking task in that while much of Piaget's theorizing about the nature of egocentrism has been retained, his notion of stage is rejected. The very fact that the scores on the role-taking task varied considerably was evidence against a strong egocentric-nonegocentric division. It was found that even the scoring scheme used by the originator of the task (Light, 1979) was far too narrow to incorporate the richness of responses displayed by the children. Some of the children were said to be "in transition" (a term that was used elsewhere as a response classification in the word awareness experiments). Even those children who manipulated the cardboard figure in what could strictly be called an egocentric manner were already displaying a kind of social sensitivity - that of consenting to accompany the experimenter, a stranger, into a room to play what to some of them must have appeared to be a silly little game.

The results of the experiments also showed a developmental trend. As children get older, they are better able to treat language as an object as well as being better able to adopt another's perspective. Of course there were exceptions, as it was also found that scores on some of the word awareness tasks correlated with scores on the role-taking task relatively

independent of the effects of age. Thus a few very young children were remarkably aware of language and themselves as social beings. It is hypothesized that these perspective-taking abilities will manifest themselves in more and more contexts as children's contact with the environment expands. (It appears that at the other end of the scale of life, one's environmental contacts may become fewer and fewer, as evidenced by the increasing number of reports that deal with the loneliness of old age. Furthermore, the speech of some of these seniors has occasionally been labelled egocentric.)

Support was shown for the Vygotskian point of view that sees children as social creatures, aware of their surroundings. The strong positive correlations found between the social sensitivity task and the various word tasks suggest that the behavioural demonstrations of the awareness of another's point of view and the awareness of words are related.

We can now return to the basic questions that were posed in the introductory chapter and see if the research which was described in the subsequent chapters has shed any light on possible answers. The questions were: What role, if any, does linguistic awareness play in the acquisition of language? Is it a prerequisite to, or a result of other cognitive activities? Does linguistic awareness develop, and if so, does this coincide with any other aspects of development?

In order to answer the first of these questions, let me first take a step back. When I initially became interested in studying linguistic awareness (metalinguistic awareness as it was then called), the aim was to connect linguistic awareness with the ability to read. It had been hypothesized that one could not learn to read without first being able to separate the sound stream into words, second being able to dissociate the spoken word from the object it referred to, and third being able to make a connection between the arbitrary squiggles on paper, the spoken word and the object itself. Many researchers picked up on this topic and as the research grew and expanded I became curious as to the origins of linguistic awareness itself. Babies born in the Western world surely have no idea that in six years time they will be required to spend their days in a classroom, and that if they learn how to read it will ease the trip through the school years. So when does a child become aware of language?

It appears that linguistic awareness is tied up to some extent with the acquisition of language itself. This was shown, for example, by the positive correlation found between the two-year-old monolingual children's median number of syllables per utterance and their scores on the word order task. Other evidence that supports this interaction hypothesis comes from the study of the bilingual two-year-olds in Montreal (see Appendix

A). Once again a relation was shown between M.N.S.U. and appropriate behaviour on the word tasks which were given to them. Recently a study was conducted which compared the word task capabilities of language-deficient (from a clinical diagnosis) children with those of a group of two- and three-year old children (Sinclair and Holobow, 1984). A test of nonverbal intelligence was also administered and the median number of syllables per utterance was calculated for each child. It was found that nonverbal intelligence did not correlate with any other measures, but the ability to decentre correlated not only with the median number of syllables per utterance, but also with scores on some of the word awareness tasks that were administered. It is suggested that children who are language deficient suffer not only from a retarded ability to produce and comprehend language, but also from a retarded ability to decentre and to treat language as an object.

However, although correlations indicate relationships, the question is still unanswered about whether one skill is a prerequisite to or a result arising from another skill. Whether the system is one of one-way causal interactions (for example, the development of language causally affects the development of linguistic awareness), two-way causal interactions (for example, the model proposed by Marshall and Morton, 1978), or no direct causal connections (but where other developmental factors mutually affect both), is a

question which remains to be empirically tested.

The more intriguing question involves the interplay between linguistic awareness, language acquisition and cognitive development. One of the tenets this thesis has been built on is that linguistic awareness is the ability to treat language as an object, and that while young children may have the capacity to demonstrate certain skills that could be said to be embedded in linguistic awareness, they do not have the ability to express these skills in a wide range of contexts. In other words, to draw an analogy with Donaldson's (1978) conception of cognitive development, the skills are not context-free, but context-dependent. It is a researcher's job to devise tasks that are appropriate for children, appropriate in the sense that they will maximally allow children to exhibit their capabilities. The modifications that were employed in the experiments described in this thesis (such as giving feedback during the practice sentences in the word order task, checking that both meanings of a homonym were in each child's vocabulary, unlike Campbell and Bowe (1978), and showing that, in line with the auditory perception literature, synthesis was easier than analysis in the compound word experiment) all helped to liberate the children's awareness. Some of the other modifications were such that perhaps they made "human sense" (Donaldson, 1978) to the children.

The role-taking task that was administered in most of the experiments contained in this thesis tested children's ability to take account of another person's point of view, and as such, it gave an indication of their ability to decentre. The strong positive correlations that were found between scores on this task and scores on the word awareness tasks indicated that linguistic awareness is related to cognitive development.[1] To extend this even further, it may well be that the development of linguistic awareness is largely responsible for the development of reflective awareness - that it has a profound effect on children's ability to apply their intellectual skills in a wide range of contexts as Donaldson (1978) has suggested.

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[1] We realize, of course, that there is far more to cognitive development than one decentering task will be able to demonstrate. Future research will have to explore this aspect of development with more depth.

The most encouraging thing to see when one is standing in a nursery on a cold, rainy, windy day is the enthusiasm the children show for living and learning - the absolute joy that running, screaming, interacting and playing brings. One can't help also but notice that certain catchy little sayings spread like wildfire throughout a nursery on a given day, expressions from "not by the hair on my chinny chin chin" to "sugar and spice" -

and everything nice.

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APPENDIX A

LINGUISTIC AWARENESS IN BILINGUAL TWO-YEAR-OLDS

Introduction

The purpose of this study was to test the hypothesis that if linguistic awareness and language acquisition were related, then children being raised bilingually should have the ability to treat language as an object. The focus was on context - perhaps one of the reasons why the monolingual two-year-olds may have been performing relatively poorly on the word tasks may have been that they had not yet learned to use their linguistic awareness abilities in a wide range of contexts, particularly a context such as the testing situation.

It has been argued that access to two languages in early childhood might promote an awareness of linguistic operations and a more analytic orientation to linguistic input. Vygotsky (1962), for example, stated that being able to express the same thought in different languages would enable the child to

> "see his language as one particular system among many, to view its phenomena under more general categories, and this leads to awareness of his linguistic operations." (page 110)

Leopold (1949) and Imedadze (1960) have both argued on the basis of observational studies of children's simultaneous acquisition of two languages that bilingualism can accelerate the separation of name and

object and can help focus the child's attention on certain aspects of language. In more recent years, Lambert and Tucker (1972) suggested that the children who were in the experimental group of the first total immersion project in Canada had learned to engage in a form of contrastive linguistics by comparing similarities and differences in their two languages.

In studies conducted with middle class Hebrew-English and lower class Spanish-English bilinguals, Ben-Zeev (1977 a,b) reported findings which suggest that bilinguals develop a more analytic orientation to language and more sensitivity to feedback cues. She hypothesized that bilinguals develop their analytic strategy towards language as a means of overcoming interlingual interference. In a similar kind of study, Cummins (1978) also found that bilingualism seemed to promote both linguistic awareness and an analytic orientation to linguistic input.

However, most of these results were obtained by administering oral and written tests to children who not only were already quite competent speakers, but who also had a few years of schooling under their belts (the ages ranged between seven and twelve years). The aim of the present study was to see if these skills of linguistic awareness would manifest themselves in the behaviour of children just two years of age.

Method

Six two-year-old children (three boys and three girls) living in Montreal, Canada were visited monthly, over a four-month period. With one exception, the children were being raised in what has been called a "one parent - one language" environment, which means that if the mother (or caretaker) speaks one language, then the father speaks a different language exclusively with the child. For example, the French Canadian mother of Marie spoke only French with her while her English Canadian father spoke only English with her. (Both parents were bilingual, however.) It is not uncommon to find such couples in Montreal, a city where both anglophones and francophones make up the majority of the population. The children all came from middle class homes. At the beginning of the study, their ages ranged from 2;2 to 2;10.[1]

Each session was run in the same fashion as the comparable session with the two-year-old monolingual children in Edinburgh. Spontaneous speech was recorded and then a word task was administered. The order in which the tasks were given was also the same: the first session used the Gleitman, Gleitman and Shipley (1972) role-modelling procedure in an attempt to elicit judgements about word order; the second session used hand puppets to try and elicit the same judgements; in the third session the word block game was played, which

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[1] It was our impression that all of the children were equally fluent in both languages.

asked the children to drop one block in a bucket for each word of a given sentence; and in the fourth session the children were asked to construct a word from a given starting sound (the "I spy" game). All sessions were tape recorded and later transcribed.[1]

RESULTS

The Word Order Tasks

Because the children responded similarly in both the role-modelling and the hand puppet situations (unlike their monolingual counterparts), the results for the two sessions have been combined. Table 1 lists the ages, the median number of syllables per utterance and the proportions of repetitions and corrections that were given by the children.

All of the children repeated the grammatical three-word correct order sentences as such with no errors. This meant that in no instance was a stimulus sentence like "Throw the ball" repeated as "Throw ball" (an instance which did occur amongst some of the monolingual two-year-olds). Four of the six children actually corrected the ungrammatical imperatives more than 50 percent of the time. These ungrammatical imperatives included three-word reversed order, two-word reversed order and errors of inflection strings. The high proportions of corrections stand in direct contrast

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[1] Each session always began in the mother's language and then switched during the task.

to the proportions of corrections offered by the monolingual children. Examples of the corrections include:

Stimulus Sentence:	Car the push.
Roger (2;4):	Push the car. Okay?
Stimulus Sentence:	Doll dress.
Jane (2;6):	Dress the doll.
Stimulus Sentence:	Balle la lance.
Marie (2;2):	Non. Lance la balle.
Stimulus Sentence:	Dress doll the.
Robert (2;10):	That's wrong. No. Dress the doll.

A series of Kendall Rank Correlation Coefficients revealed that there existed no relation between the ages of the children and the proportions of corrections they made ($\underline{T}$ = - .07, N = 6, $\underline{p}$ > .10). In addition, there was no correlation between age and M.N.S.U. ($\underline{T}$ = + .07, N = 6, $\underline{p}$ >.10). There was, however, a significant positive correlation between M.N.S.U. and the children's proportions of corrections of ungrammatical strings ($\underline{T}$ = + .73, N = 6, $\underline{p}$ < .05). The child who made the fewest corrections was also the child who had the lowest M.N.S.U. It was interesting to note that this child was the only one not being raised with the one parent - one language philosophy -- his mother continually switched between English and French. Guy seemed to be having difficulty in both languages, and he even mixed the languages mid-expression (for example, he said "Puis me" instead of either "Puis moi" or "Me next").

Insofar as the ability to correct the word order of reversed and scrambled sentences is a behavioural manifestation of the ability to treat language as an object, and insofar as the median number of syllables per utterance is a reflection of a child's linguistic ability; then it can be said that this study has shown that linguistic awareness and language acquisition are positively related.

The Word Blocks Game

This game used "word blocks" to determine if the children could separate the spoken stream into discrete units. The task was to drop one block into a container for each word of a spoken sentence. The example was the same one as was used for the monolingual two-year-olds: Elephants (drop) live (drop) in (drop) the (drop) zoo (drop).

All but one child (Melanie) at least attempted to do the task. The most common strategy adopted was to drop one or two blocks into the bucket with an expression, and to repeat it until all the blocks were gone:

Stimulus Sentence:	Go away.
Guy (2;5):	Then go way (drop). Go way (drop) Go way (drop).
Stimulus Sentence:	Pompom's outside.
Jane (2;6):	Pompom's outside (drop). Pompom's outside (drop).
Stimulus Sentence:	Rabbits like carrots.

Roger (2;4): Rabbits an carrots (drop).
Rabbits an carrots (drop).

However, very occasionally a different way of segmenting was used by the same three children:

Stimulus Sentence: Lunch is ready.
Guy: Ready! (drop). Lunch (drop).
Lunch (drop).

Stimulus Sentence: I have brown eyes.
Jane: I have (drop). Brown eyes (drop).

Stimulus Sentence: (none)
Roger: One (drop). Two (drop). Three (drop). Four (drop). Five (drop).

Marie tended to drop one block in the bucket for each syllable she repeated:

Stimulus Sentence: I can open this.
Marie: I (drop) can (drop) o (drop) pen (drop) this (drop).

Robert was very accurate in segmenting sentences word-by-word:

Stimulus Sentence: Apples grow on trees.
Robert: Apples (drop) grow (drop) on (drop) trees (drop).

Stimulus Sentence: I ate breakfast.
Robert: I (drop) ate (drop) break (drop) break (drop) breakfast (drop). I said break, break <u>breakfast</u>!

What is interesting is that it was the two more linguistically advanced children (Marie and Robert) who were able to segment a spoken phrase into smaller units. Marie used syllables and Robert used words as the units of analyses. The other children most often did not segment the phrases, but there was a slight indication that they were capable of segmenting a phrase into units.

The game "I spy"

This game asked the children to think of a word that began with a certain phoneme given by the experimenter:

"I spy with my little eye, something that begins with / /".

The response descriptions which follow are discussed in order of increasing M.N.S.U. (unfortunately, Melanie was not available for this last session).

Guy became very frustrated when the experimenter started this game. He yelled "No!" and later "Nomi go home" after repeated attempts to get the game going. Marie seemed to grasp the nature of the game after five tries and from then on gave mostly correct responses. Jane cottoned on quite quickly to the task:

Experimenter: I spy with my little eye, something that begins with /tch/.
Jane: Chair!

Roger gave answers that were correct for only about 50 percent of the time:

Experimenter: I spy with my little eye, something that begins with /b/.
Roger: Bee!

Experimenter: I spy with my little eye, something that begins with /t/.
Roger: Crayon!

Robert needed only one practice trial before he cottoned on:

Experimenter: I spy with my little eye, something that begins with /s/.
Robert: Snake.

Experimenter: I spy with my little eye, something

that begins with /tch/.

Robert: Choo choo! Now I can do it. I spy with my little eye that begins with /k/.

Experimenter: /k/ cutter truck.

It appeared that this latter task of synthesis was easier for the children than the previous task, which was one of analysis. Corroboration for this finding lies with the similar results obtained for the compound word study with nursery school children (see Chapter 4).

CONCLUSIONS

With the exception of Melanie, who was so shy that she would not let the experimenter even sit close to her, the other five bilingually-raised children seemed to enjoy having the experimenter play with them. These youngsters were able to demonstrate an ability to treat language as an object, as it related to their language ability itself. The results offer support for the interaction hypothesis between linguistic awareness and language acquisition proposed by Smith and Tager-Flusberg (1982). We would also argue that the bilinguals' relative success on these tasks when compared to the performances of their monolingual counterparts could well be explained in terms of the context-dependent / context-independent issue described by Donaldson (1978). Bilingual children could well have more opportunities for using linguistic awareness skills in trying to learn more than one language. For example, in simply learning the names of objects around them, bilingual children are

faced with having to learn two verbal labels for the same referent.

" ... bilinguals become aware of their language as internally consistent systems more than do other children because this kind of understanding provides a way of separating their languages from each other." (Ben-Zeev, 1977 c, page 45)

Table 1. Proportions of repetitions and corrections of grammatical and ungrammatical imperatives: bilingual two-year-olds.

Name	Age months	M.N.S.U.[1]	Grammatical repeated correctly	Ungrammatical: repeated as such	Ungrammatical: corrected
Marie	26	3.15	1.00	.23	.77
Roger	28	4.86	1.00	.39	.61
Guy	29	2.83	1.00	.75	.25
Jane	30	3.46	1.00	.48	.52
Melanie	32	2.91	1.00	.67	.33
Robert	34	5.81	1.00	.20	.80

[1] M.N.S.U. refers to the median number of syllables per utterance.

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APPENDIX B

Stimulus sentences used in the word order tasks.

1. Bring the newspaper.
2. Book the read.
3. Dishes wash.
4. Dress doll the.
5. Turn on the light.
6. Ball throw.
7. Plays the piano.
8. Car the push.
9. Read book.
10. Throw the ball.
11. Wash dishes the.
12. Draw a picture.
13. Dress doll.
14. Read the book.
15. Wash dishes.
16. Sing a song.
17. Throw ball the.
18. Book read.
19. Drinks your milk.
20. Push the car.
21. Comed here.
22. Sings a song.
23. Dress the doll.
24. Push car.
25. Ball the throw.
26. Post the letter.
27. Brings the newspaper.
28. Push car the.
29. Doll dress.
30. Find the pencil.
31. Dishes the wash.
32. Drink your milk.
33. Come here.
34. Draws a picture.
35. Throw ball.
36. Play the piano.
37. Read book the.
38. Car push.
39. Doll the dress.
40. Wash the dishes.

APPENDIX C

Lists of questions asked in the first homonym experiment.

List A

1. a) Can a nail be hammered?
   b) Can this be hammered? (finger nail)

2. a) Can glasses be worn?
   c) Can this be worn? (toy truck)
   b) Can these be worn? (drinking glasses)

3. a) Can a needle be threaded?
   b) Can this be threaded? (kintting needle)

4. a) Can flour be used to bake with?
   c) Can this be used to bake with? (toy moose)
   b) Can this be used to bake with? (flower)

5. a) Can a straw be used to drink with?
   b) Can this be used to drink with? (field straw)

6. a) Can a pipe be smoked?
   c) Can this be smoked? (paper clip)
   b) Can this be smoked? (metal pipe)

7. a) Can a plug be used to stop up a sink?
   b) Can this be used to stop up a sink? (electric)

8. a) Can a horn be used to make music?
   c) Can this be used to make music? (flour)
   b) Can this be used to make music? (animal horn)

9. a) Can a paper be read?
   b) Can this be read? (wrapping paper)

10. a) Can a stamp be used to post a letter?
    c) Can this be used to post a letter? (metal nail)
    b) Can this be used to post a letter?(rubber stamp)

11. a) Can a rubber be used to rub out a mistake?
    b) Can this be used to rub out a mistake? (shoe)

List B

1. a) Can a nail grow long so that it has to be clipped?
   b) Can this grow long so that it has to be clipped? (metal nail)

2. a) Can glasses be drunk out of?
   c) Can this be drunk out of? (pencil)
   b) Can these be drunk out of? (eye glasses)

3. a) Can a needle be used to knit with?
   b) Can this be used to knit with? (sewing needle)

4. a) Can a flower be planted?
   c) Can this be planted? (wrapping paper)
   b) Can this be planted? (flour)

5. a) Can straw grow in a field?
   b) Can this grow in a field? (drinking straw)

6. a) Can water come through a pipe?
   c) Can water come through this? (eraser)
   b) Can water come through this? (smoking pipe)

7. a) Can a plug be used to make electric things work?
   b) Can this be used to make electric things work? (sink plug)

8. a) Can a cow grow a horn?
   c) Can a cow grow this? (paper clip)
   b) Can a cow grow this? (music horn)

9. a) Can paper be used to draw on?
   b) Can this be used to draw on? (newspaper)

10. a) Can a stamp be used to make a mark on paper?
    c) Can this be used to make a mark on paper? (toy moose)
    b) Can this be used to make a mark on paper? (postage stamp)

11. a) Can a rubber be worn on feet?
    b) Can this be worn on feet? (eraser)

APPENDIX D

Name _____ Birth _____ group _____ sect _____

	A								B & C															
									How								Why not							
			What		A l		re				funct			ling			funct			ling				
	Y	N	iv	ot	y	n	y	n	Y	N	pro	con	dk	nam	ch	ot	pro	con	dk	nam	ch	ot		
1. nail																								
2. glasses																								
3. needle																								
4. flowr																								
5. straw																								
6. pipe																								
	Y	N	iv	ot	y	n	y	n	Y	N	pro	con	dk	nam	ch	ot	pro	con	dk	nam	ch	ot		
7. plug																								
8. horn																								
9. paper																								
10. stamp																								
11. rubber																								

Classification _____

Orientation _____

Sample Scoring Sheet for the first Homonym experiment.

APPENDIX E

Name_____ Birth_____ Group_____

Right way up O & C									
Corr plac	Incorr inv	Incorr oth	promp	spon corr be q	query yes	query no	change to cor	change to inc inv	change to inc oth	other

Upside down O & C									
Corr plac	Incorr inv	Incorr oth	promp	spon corr be q	query yes	query no	change to cor	change to inc inv	change to inc oth	other

Right way up for O									
Corr plac	Incorr inv	Incorr oth	promp	spon corr be q	query yes	query no	change to cor	change to inc inv	change to inc oth	other

Right way up for C									
Corr plac	Incorr inv	Incorr oth	propm	spon corr be q	query yes	query no	change to cor	change to inc inv	change to inc oth	other

Upside down for O									
Corr plac	Incorr inv	Incorr oth	promp	spon corr be q	query yes	query no	change to cor	change to inc inv	change to inc oth	other

Classification: _____

Sample Scoring Sheet for the Role-taking task.

APPENDIX F

Classifications of responses on the role-taking task.

0 - couldn't have grasped task. All answers inverse or other, needed prompting.

1 - two egocentric placements, needed prompting.

2 - two egocentric placements, no prompting needed.

3 - two egocentric placements, also either first orientation-to-both (1) wrong, or orientation-to-self (4) wrong.

4 - initially correct on both orientation-to-other trials (3 and 5), then changed to inverse.

5 - one egocentric placement, also orientation-to-self (4) wrong.

6 - one egocentric placement, needed prompting. Also gave inverse and other before correcting on first orientation-to-both (1).

7 - one egocentric placement, hesitation, changed to other.

8 - one egocentric placement (5), no prompting needed.

9 - all answers correct except for orientation-to-self (4).

10 - completely correct except for first question, where prompting was needed and inverse and other may have occurred before a change to correct.

11 - completely correct, no prompting needed.

APPENDIX G

Name_____ Birth_____ Group_____

	Need		glas		pipe		nail		stamp		horn		flowr		plug		straw		rubb		paper	
	s	k	d	e	m	s	m	f	p	r	m	a	u	w	s	e	d	f	s	e	n	w
s. needle																						
k. needle																						
d. glasses																						
e. glasses																						
m. pipe																						
s. pipe																						
m. nail																						
f. nail																						
p. stamp																						
r. stamp																						
m. horn																						
a. horn																						
flour																						
flower																						
s. plug																						
e. plug																						
d. straw																						
f. straw																						
sh. rubber																						
e. rubber																						
n. paper																						
w. paper																						

Classification_____

Orientation _____

Sample Scoring Sheet for the second Homonym experiment.

APPENDIX H

Lists of pictures used in the compound word task.

Synthesis

1.	butter fly	1 car - distractor 2 butterfly - target 3 bread - semantic A 4 cricket - semantic B
2.	foot ball	1 boot - semantic A 2 table - distractor 3 football - target 4 rugby ball - semantic B
3.	tea pot	1 plant - semantic B 2 tea in cup - semantic A 3 stuffed dog - distractor 4 teapot - target
4.	lip stick	1 lipstick - target 2 smile - semantic A 3 cricket bat - semantic B 4 tricycle - distractor
5.	ice cream	1 snow - semantic A 2 icecream - target 3 pencil crayons - distractor 4 milk - semantic B
6.	sun glasses	1 Christmas balls - distractor 2 sunglasses - target 3 pitcher - semantic B 4 candle light - semantic A
7.	rubber band	1 clarinet - semantic B 2 toy animal - distractor 3 rubberband - target 4 shoe - semantic A
8.	tooth brush	1 paint brush - semantic B 2 lips - semantic A 3 sled - distractor 4 toothbrush - target
9.	nut cracker	1 nutcracker - target 2 paints - distractor 3 bowl of peanuts - semantic A 4 Santa Claus - semantic B

10.	pine apple	1 tree - semantic A 2 fruit - semantic B 3 pineapple - target 4 toy telephone - distractor
11.	fish finger	1 toy clock - distractor 2 fishfinger - target 3 baby's hand - semantic B 4 fish hanging - semantic A
12.	straw berry	1 hat - semantic B 2 game - distractor 3 field straw - semantic A 4 strawberry - target
13.	bow tie	1 arrow - semantic A 2 guitar - distractor 3 bowtie - target 4 shirt - semantic B

Analysis

1.	toothbrush	1 toothpaste - semantic whole 2 brush - target B 3 scooter - distractor 4 tooth - target A 5 lips - semantic A
2.	sunglasses	1 pitcher - semantic B 2 tricycle - distractor 3 sun - target A 4 eyes - semantic whole 5 wine glasses - target B
3.	strawberry	1 beret - target B 2 fruit - semantic whole 3 glass with liquid - semantic A 4 toy village - distractor 5 straw - target A
4.	bowtie	1 bow - target A 2 tie - target B 3 pig - distractor 4 shirt - semantic B 5 shoelaces - semantic whole
5.	lipstick	1 wooden truck - distractor 2 lip - target A 3 eye shadow - semantic whole 4 stick - target B 5 cricket bat - semantic B

6.	pineapple	1 palm tree - semantic whole 2 fruit - semantic B 3 apple - target B 4 pine - target A 5 toy workbench - distractor
7.	rubberband	1 shoe - semantic A 2 crab - distractor 3 rubber - target A 4 cellotape - semantic whole 5 band - target B
8.	fishfinger	1 finger - target B 2 fish - target A 3 ring - semantic A 4 pipe - distractor 5 chicken and chips - semantic whole
9.	football	1 game - semantic whole 2 golf ball - target B 3 toy rabbit - distractor 4 shoe - semantic A 5 foot - target A
10.	nutcracker	1 nut - target A 2 stuffed bears - distractor 3 gifts - semantic B 4 can opener - semantic whole 5 cracker - target B
11.	icecream	1 wagon - distractor 2 icecream - semantic whole 3 ice - target A 4 cream - target B 5 snow - semantic A
12.	butterfly	1 bread - semantic A 2 moth - semantic whole 3 fly - target B 4 rocking horse - distractor 5 butter - target A
13.	teapot	1 kettle - semantic whole 2 pot - target B 3 doll - distractor 4 tea - target A 5 plant - semantic B

APPENDIX I (a)

SYNTHESIS

Name_____ Birth_____ Group_____ Sect_____

	Choice	Interpretation				
		Target	Sem A	Sem B	Distractor	
butter & fly						
foot & ball						
tea & pot						
lip & stick						
ice & cream						
sun & glasses						
rubber & band						
tooth & brush						
nut & cracker						
pine & apple						
fish & finger						
straw & berry						
bow & tie						

Classification_____

Orientation_____

Analysis_____

Sample Scoring Sheet for the Synthesis task.

APPENDIX I (b)
ANALYSIS

Name_____ Birth_____ Group_____ Sect_____

	Choice		Interpretation											
	1	2	Tar	Wh	SA	SB	Di	Tar	Wh	SA	SB	Di	Comb	Tot
toothbrush														
sunglasses														
strawberry														
bowtie														
lipstick														
pineapple														
rubberband														
fishfinger														
football														
nutcracker														
icecream														
butterfly														
teapot														

Classification_____

Orientation _____

Synthesis _____

Sample Scoring Sheet for the Analysis task.