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The Development and Initial Validation of a Scale to Measure Cognitive Fusion

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ABSTRACT

Aim: This thesis describes the development and initial validation of a questionnaire to measure Hayes, Strosahl and Wilson's (1999) constructs of cognitive fusion and cognitive defusion. Within the literature there is currently no specific measure of these constructs.

Design and Method: Principal Component Analysis was conducted on two independent samples (Study One n = 425 and Study Two n = 167). Reliability analyses were conducted for both Study One and Study Two and validation analyses were conducted in Study Two. All participants in both studies completed the Cognitive Fusion Questionnaire (CFQ). Participants in Study Two completed additional measures related to their satisfaction with life, their beliefs about worry, mindful responding to unpleasant thoughts and images and levels of experiential avoidance.

Results: The final solution revealed a two component fifteen item questionnaire accounting for 54% of the variance. Based on item content, the components were labelled *fusion* and *defusion*. The items within the questionnaire reflected Hayes *et al*. (1999) constructs of cognitive fusion and cognitive defusion. Internal consistencies as measured by Cronbach's alpha were .91 (fusion), .71 (defusion) and .88 (total scale). The measure correlated moderately to highly and in the expected directions with questionnaires measuring individual beliefs about worry, mindful responding to unpleasant thoughts and images and levels of experiential avoidance. Similarly, there was a significant negative correlation between the current questionnaire and a measure related to satisfaction with life.

Conclusions: The findings of the above research provide initial support for the CFQ. The results show support for the validity of the scale including content and convergent validity of the CFQ.

1 CHAPTER ONE: INTRODUCTION

This thesis describes the evaluation and development of the Cognitive Fusion Questionnaire (hereafter referred to as CFQ), an instrument designed to measure Hayes, Strosahl and Wilson's (1999) notions of cognitive fusion and cognitive defusion. Both constructs are fundamental to the Acceptance and Commitment Therapy model (ACT). Despite its central premise to the model, there is not currently a reliable and valid way of measuring these constructs.

The present study provides an overview of Acceptance and Commitment Therapy's position within the field of psychotherapy and an outline of where the model developed from. A review of ACT's underlying theoretical model will be provided focusing firstly on the constructs of experiential avoidance and cognitive fusion, and then latterly on the concept of cognitive defusion. An operational definition of cognitive fusion and cognitive defusion is provided and both constructs inform the development of the items for the CFQ. In order to provide a justification for the development of this measure, a review is provided on current questionnaires that assess similar constructs to cognitive fusion and cognitive defusion. The review concludes that these measures inadequately address key aspects associated with Hayes *et al's.* (1999) notion of cognitive fusion and cognitive defusion. Finally, the procedures for establishing the preliminary psychometric properties of a measure of the constructs are described.

1.1 Acceptance and Commitment Therapy: The "Third Wave of Behaviour Therapy

During the past several years there has been a recognisable change within the literature particularly in the field of behavioural and cognitive therapies (Hayes, 2004b). The history of behaviour therapy over the past half century has been divided into three semi-distinct eras (Hayes, 2004b). The first wave of behaviour therapy emerged in the late 1950s and continued into the 1960s, which developed via the limitations of psychoanalytic theory (Forman and Herbert, 2006). Behaviour therapy adopted an empirical, objective and scientific stance to the understanding and treatment of psychological problems. Within the approach, problematic behaviour was modified through classical (Wolpe, 1958) and operant (Skinner, 1953) learning principles. However, in the late 1960s through to the 1990s greater emphasis was being placed on the importance of cognitive factors to both theory and practice (Brewin, 2006). Bandura's (1969) work on observational learning was particularly important in drawing attention to cognitive factors as playing a critical role in individuals' interpretation of environmental stimuli. This era was referred to as the second wave of behaviour therapy. Rational Emotive Behaviour Therapy (Ellis, 1962) and Cognitive Therapy (Beck, Rush, Shaw and Emergy, 1979) were amongst several of the psychotherapies that were developed that combined cognitive and behavioural change strategies (Brewin, 2006).

The defining feature of Beck *et al's.* (1979) cognitive model is the assumption that therapeutic effects are mediated by changes in cognitions, including thoughts, beliefs and schemas (Forman, Herbert, Moitra, Yeomans and Geller, 2007). The cognitive model is often supplemented with a number of behaviour change methods. However, the fundamental

purpose of these behaviour change strategies is to effect a change in dysfunctional cognitive structures and processes (Beck *et al.* 1979). Although cognitive therapy incorporates some of the behavioural principles, the approach is largely distinguished from the larger family of behaviour therapies because of its emphasis on cognitive factors in addition to the direct attempts to modify cognitive processes (Longmore and Worrell, 2006). Challenging the meaning of dysfunctional thoughts can be achieved by evaluating the evidence for and against a thought using written thought records, eliciting more realistic thoughts and looking for evidence of distorted thinking. While Cognitive Behaviour Therapy (CBT) can be conceptualised as a broad umbrella of related models of psychotherapy, cognitive therapy is the most well known and researched model (Beck, 2005).

To date there are now over 325 published outcome studies on cognitive behavioural interventions (Butler, Chapman, Forman and Beck, 2006). A recent review of 16 meta-analyses found multi-study support for the effectiveness of cognitive therapy to treat a plethora of disorders and problems including unipolor and bipolar depression, panic disorder, obsessive-compulsive disorder, social anxiety disorder, generalised anxiety disorder and bulimia nervosa (Butler *et al.* 2006). There is substantial literature supporting the efficacy of cognitive therapy when compared to a number of control conditions including pharmacological interventions (Beck, 1997). However, it is also widely accepted that there are a number of factors that potentially bias the results of these findings and numerous limitations within the studies have been identified including the control conditions used, the level of training of therapists used in their studies and study therapists' allegiances to specific approaches (Longmore and Worrell, 2006).

1.2 Limitations of the second wave therapies

A number of authors have questioned whether therapists need to use logico-rational strategies to directly challenge maladaptive thoughts (Longmore and Worrell, 2006). Within the literature a number of treatment component analyses have failed to support the postulated mediator in cognitive therapy thus raising doubts as to whether cognitive interventions provide significant value to therapy. McManus, Clark and Hackmann (2000) compared the outcomes of twenty three individuals with social phobia who either received cognitive therapy or pharmacology with instructions for self-administered exposure. Belief change for the key cognitions thought to underlie social phobia was measured by the Social Probability and Cost Questionnaire (SPCQ; Foa, Frankin, Perry and Herbert, 1996). The authors found that by the end of treatment there were equally significant reductions in participants' estimations of the probability and cost of negative social events in both treatment conditions.

Simons, Garfield and Murphy (1984) studied both symptom and cognitive change in twenty eight depressed outpatients who received either cognitive therapy or pharmacotherapy. As measured on the Dysfunctional Attitudes Scale (DAS; Weissman and Beck, 1979) and the Automatic Thoughts Questionnaire (ATQ; Hollon and Kendall, 1980) both cognitive therapy and pharmacotherapy produced similar levels of change on the cognitive as well as the symptom measures. The authors concluded that the cognitive change was a part of the improvement seen in treatment, rather than a primary cause of improvement.

These findings are further supported by Oei and Free (1995) who meta-analytically tested the relationship of non-cognitive psychological therapies and change in cognitions. They found

that cognitive therapy and other therapies did not differ significantly in terms of their effect on cognition. The authors also found that drug therapies were found to produce changes in cognitions equivalent to the two classes of psychological treatments.

Jacobson and Hollon (1996) also provide evidence that cognitive interventions are not needed to effect changes in cognition. The authors assigned depressed participants to one of three conditions, behavioural activation; behavioural activation plus coping skills related to automatic thoughts, and complete cognitive treatment, which included behavioural activation, coping skills and identification and modification of core dysfunctional schemas. Jacobson and Hollon (1996) found that behavioural activation altered negative thinking and dysfunctional attributional styles to the same degree as either of the two cognitive treatments. Moreover, they found that all three treatments were equally efficacious. However, Longmore and Worrell (2007) argue that the behavioural activation condition may have entailed the modification of dysfunctional thoughts and assumptions. They also state that the two cognitive treatments were not *less* effective, but rather equally effective.

1.3 Third Generation Behaviour Therapies

Within the literature new breeds of CBT have emerged. These breeds have established themselves as the 'third generation behaviour therapies' or 'acceptance-based' therapies as they are sometimes referred to (Corcoran and Segal, 2008). The new "third wave" therapies place emphasis on the relationship between the person and their thoughts and feelings (Fletcher and Hayes, 2005). More specifically Hayes (2004b) notes that,

"Grounded in an empirical, principle focused approach, the third wave of behavior and cognitive therapy is particularly sensitive to the context and functions of psychological phenomena, not just in their form and this tends to emphasize contextual and experiential change strategies in addition to more direct and didactic ones. These treatments tend to seek the construction of broad, flexible and effective repertoires over an eliminative approach to narrowly defined problems, and to emphasize the relevance of the issues they examine for clinicians as well as clients" (p.658).

Examples of such third generation therapies include Dialectical Behavior Therapy, DBT, (Linehan, 1993), Functional Analytic Psychotherapy, FAP, (Kohlenberg and Tsai, 1991) Mindfulness Based Cognitive Therapy, MBCT, (Segal, Teasdale and Williams, 2002) and Integrative Behavioural Couples Therapy, IBCT, (Jacobson and Christensen, 1996). Together, these approaches have gained increasing prominence in recent years. Another example is Acceptance and Commitment Therapy (ACT) (Hayes, Strosahl and Wilson, 1999).

1.4 Acceptance and Commitment Therapy: The Theoretical and Philosophical Underpinnings of the Model

Acceptance and Commitment Therapy (ACT) evolved, in part, from traditional cognitive and behavioural models (Zettle, 2005). The approach is considered as a modern form of behavioural analysis due to its philosophical and theoretical underpinnings (Hayes *et al.* 1999). According to Hayes and colleagues (1999) the approach is rooted in a pragmatic

philosophical position called functional contextualism (Hayes and Reese 1988). Underpinning the notion of functional contextualism is the idea that the whole event is primary (Twohig, Masuda, Varra and Hayes, as cited in Orsillo and Roemes, 2005). This essential analytic unit of functional contextualism is the component described as the 'ongoing act in context'. This concept is linked to four core components that include focusing on the whole event and sensitivity to the role of context in understanding the nature and function of an event. For example from an ACT perspective, if a client is struggling with a thought, emphasis would not be placed on establishing whether that thought is true or rational (Twohig *et al.* 2005). Rather, the authors suggest the primary issue is to understand the whole event, the function that the thought serves, the condition in which the thought occurs, how the person reacts to the thought and, importantly, what the entire pattern of action is in the service of. The approach emphasizes that the contextual features do not assemble the whole unit, they are facets of the whole unit and for this reason the entire analysis is viewed contextualistically (Hayes *et al.* 1999).

Through the environment, the behaviour analyst attempts to identify aspects that influence the occurrence, frequency and intensity of both private and overt psychological events. Once established, the approach attempts to alter the function of unwanted thoughts and feelings by modifying the psychological contexts in which they are experienced.

1.5 ACT's Theory of Psychopathology: The Process of Language and Relational Frame Theory

From an ACT perspective, human suffering and psychological discomfort are viewed as inevitable parts of human existence (Hayes *et al.* 1999). To account for this, the authors suggest that the complexity of the human brain allows one the unlimited possibility to think about abstract concepts that enable us to put ourselves in painful situations, regardless of our external circumstances. They put forward the suggestion that human beings have the ability to plan in advance and anticipate consequences far into the future. Hayes, Luoma, Bond, Mausda and Lillis (2006) suggest that it is this, in combination with the way in which language and cognition interact with direct contingencies to produce an inability to persist or change behaviour in the service of long-term valued ends, that leads to psychopathology.

The idea that language underpins psychopathology is linked to Relational Frame Theory (RFT), a theory that attempts to explain human language and cognition in behavioural terms (Hayes, Barnes-Holmes and Roche, 2001). The authors propose that RFT is a theory of verbal behaviour that is based upon principles derived from laboratory research on rule governance, stimulus equivalence and derived relational responding. To date, at least seventy empirical studies have been published in the past thirteen years (Hayes *et al.* 2001; Blackledge, 2003; Hayes, 2004b). However, the theory is considered to remain relatively unknown outside behaviourist circles for several reasons (Blackledge, 2003). According to Blackledge (2003) many people continue to be unaware of it or continue to misunderstand its implications. He proposes three reasons for this. Firstly, he states that the authors of the theory use obscure and highly technical language to describe the theory. Secondly, the

importance of human psychopathology and language in general is not obvious and finally psychologists who are not active behaviourists have long assumed that behaviourism has little if anything to do with understanding human cognition and language (Blackledge, 2003).

According to RFT, human beings learn to derive and combine stimulus relations and to bring them under arbitrary contextual control (Twohig *et al.* 2005). The notion of relationships between stimuli (i.e. by deriving relations among events, among words and events, words and words, and events and events), is referred to as relational learning.

From an RFT perspective, Twohig *et al.* (2005) identify six key concepts in relational learning. Firstly, relations show mutual entailment. The authors refer to mutual entailment as a person learning in a particular context that A relates in a particular way to B. The person derives that B and A entail some kind of relation in that context. For example, if "going into town" is said to be more fearful than "going into a shop", then a person can derive the relation that "going into a shop" is less fearful than "going into town" without direct training (Twohig *et al.* 2005). Secondly, the authors propose that such relations show combinatorial entailment, that is if a person learns in a particular context that A relates in a particular way to B, and B relates in a particular way to C, then this must entail some kind of mutual entailment between A and C in that context. A further example the authors provide is that if doing a public speech is also more fearful than going into town, then doing a public speech is also more fearful than going into a shop. The authors propose that the fundamental premise in this example is that the individual never needs to experience public speaking to feel significant anxiety in that situation as the learning occurred relationally. Thirdly, emphasis is

placed on the role of context as a determining factor in how events are relationally framed. Fourthly, according to Twohig *et al.* (2005) this relational context is initially acquired through multiple exemplar training. Multiple exemplar training is thought to involve a very large number of training trials across a variety of situational contexts that specify the response and the stimuli that occasion it. The authors contend that as a result of the many trials, no specific feature alone can evoke relational framing. This highlights the important role of context and how events become relationally framed. The fifth factor that Twohig *et al.* (2005) propose is that the direct or acquired functions of one event in a relational network can transform the stimulus functions of related events in accord with the underlying relation among them. Their final concept highlights that transformation of stimulus functions is controlled by a functional context that is also initially acquired through multiple exemplar training. For example, the statement, "I cannot do a presentation because I'm scared of making a fool of myself", includes cues to transform the function of the presentation to be a highly anxiety provoking event. According to the authors this latter example captures the importance of understanding both verbal/cognitive and direct contingency streams when trying to understand human behaviour.

In line with RFT is the idea that humans are continuously deriving relations among events, words, feelings, experiences and images as they engage with their environment, interact with others, think, observe and reason (Twohig *et al.* 2005). The authors suggest that stimuli that have never previously been directly associated with or trained can become relational and that those relations can transform stimulus functions among related stimuli.

The RFT model described above provides a basis for the assumption that psychological difficulties emerge from unhelpful contextual control over language processes (Hayes *et al.* 2006). It would appear that while the processes of language and cognition enable us to solve problems, the very same processes allow for evaluation and comparison and the ability to regurgitate painful past to present experiences (Baer, 2006). Thus, while the authors acknowledge the advantages of language and human beings' accomplishments as a result of our verbal abilities, they also recognize the drawbacks.

Hayes and colleagues (1999) acknowledge that relational learning has a number of significant implications. Human suffering, in the authors' view, originates from psychological inflexibility fostered by two core ACT processes, experiential avoidance and cognitive fusion. They argue that these specific ACT processes not only amplify psychological disorder but they also contribute to intensifying the suffering experienced by the individual.

For the purposes of the current research only the roles of experiential avoidance and cognitive fusion will be outlined and discussed.

1.6 ACT and Psychopathology: Experiential Avoidance and Cognitive Fusion

1.6.1 Experiential Avoidance

The phenomenon of experiential avoidance occurs when a person demonstrates an unwillingness to be in contact with specific private experiences such as bodily sensations, emotions, thoughts, memories and images, particularly when these private experiences are evaluated negatively (Hayes *et al.* 1999). Hayes and Gifford (1997) acknowledge that experiential avoidance is not in its essence problematic. However, they argue that as a psychological strategy it does appear to underlie several forms of psychopathology, including depression and anxiety. The authors suggest that individuals achieve avoidance by altering the form, frequency and context of difficult or unwanted private experiences. Clinical presentations of experiential avoidance include substance abuse, dissociation, binge eating or avoidance of people, places and situations (Baer, 2006). According to Blackledge and Hayes (2001) experiential avoidance is positively correlated with higher levels of psychopathology. However, the process may also interfere with an individual's progress towards valued goals and the authors argue that this predominantly results in a lower quality of life.

This leads one to question why individuals would engage in such a process that is ultimately counterproductive and largely destructive. In response to this, Hayes, Strosahl, Wilson *et al.* (2004) propose that counterproductive strategies like distraction prevent contact with those aversive experiences and as a result the distress and discomfort associated with those experiences are eliminated or reduced in the short term. However some authors, in particular Blackledge and Hayes (2001) argue that attempts to control, avoid or distract oneself from

particular thoughts or emotions may result in an increase in those unwanted thoughts or emotions. This process is captured in the quote below,

"Again and again I have said to myself, on lying down at night, after a day embittered by some vexatious matter, 'I will not think of it any more!...it can do no good whatever to go through it again. I will think of something else!' And in another ten minutes I have found myself, once more, in the very thick of the miserable business, and torturing myself, to no purpose, with all the old troubles". (Lewis Carroll, as cited in Wenzlaff and Wegner, 2000, p.1).

Numerous studies within the literature show that deliberate attempts to suppress private phenomena paradoxically leads to an increase in the prevalence of those phenomena (Hayes, 2004b). The 'white bear' experiment by Wegner, Schneider, Carter and White (1987) is an archetypal example of the effects of thought suppression. They found that when participants were instructed to suppress thoughts of a white bear they found it difficult to do so and actually reported higher incidences of 'white bear' thoughts compared to those participants who had not been instructed to suppress.

Further evidence for the process of suppression is illustrated in a wide range of psychological disorders, including for example obsessive compulsive disorder and generalized anxiety disorder. For example, Trinder and Salkovskis (1994) asked participants to identify a negative intrusive thought and to record the occurrence of the thought over a period of four days. Participants were assigned to one of three conditions and were advised to either to

record their intrusions (record only), suppress their thoughts (suppression) or to try and think about their thoughts as they occurred (expression). The results indicated that participants who had received the suppression instruction had suffered more intrusive thoughts than those in the other conditions. The study also indicated that those in the suppression condition had higher levels of discomfort compared to those in the other conditions. This suggests that suppression may not only increase the number of thoughts experienced but may also make them aversive. Relatedly, Salkovskis and Campbell (1994) found a higher rate of personally intrusive thoughts in participants who tried to suppress thoughts compared to those who simply monitored them.

Thought suppression has also been linked to subjectively higher levels of experienced pain (Sullivan, Rouse, Bishop and Johnston, 1997). Similarly, suppression of urges to engage in alcohol consumption is related to increases in the expected reinforcing effect of alcohol by heavy drinkers (Palfai, Monti, Colby and Rohsenow, 1997).

In summary, universal and naturally occurring processes of relational learning and experiential escape and avoidance amplified by cultural forces suggesting that control over internal experiences are possible and desirable, are the very same processes that increase psychological distress and impairment in functioning (Hayes *et al.* 1999).

1.6.2 Cognitive Fusion

Cognitive fusion represents another by-product of relational framing. The phenomenon of cognitive fusion occurs when one becomes entangled or fused with the literal context of there thoughts (Hayes *et al.* 1999). These thoughts and the related emotions are described by Hayes, Strosahl, Bunting *et al*. (2004) as becoming entangled to such an extent that the thoughts are then taken as true interpretations of experiences to the extent that individuals become indistinguishable from their internal experience. It is postulated that when people are in this fused mode, they fail to see the content of their thoughts as an automatic and idiosyncratic reaction to certain events. The essence of the process sucks people into losing contact with the present not just in terms of social and physical contact but also psychological contact as well (Hayes *et al.*1999).

The authors refer back to RFT to account for the theoretical underpinnings concerning cognitive fusion (Hayes *et al.* 1999). They propose that in some contexts, the bidirectional nature of verbal relations is such that verbal stimuli and their referents fuse together or become functionally inseparable. From this perspective Wilson and Hayes (as cited in Orsillo and Roemes, 2005) consider relational networks as highly resistant to "unlearning", even in the face of contradictory learning. They further suggest that behaviour governed by relational networks are highly insensitive to shifting environmental contingencies. The implication of cognitive fusion is that of prolonged and chronic psychological distress and rigidity in behavioural responding (Hayes *et al.* 1999).

The idea that recurrent negative thinking increases and maintains psychopathology has been evidenced elsewhere in the literature. Substantial research shows that individuals who ruminate in response to negative emotions experience more depressive symptoms, greater risk for future depressive episodes and longer durations of depression (Conway, Csank, Holm and Blake, 2000; Nolen-Hoeksema, 1991; Nolen-Hoeksema & Morrow 1993).

Further evidence is provided by Rachman (1998) and Salkovskis (1998). Wenzlaff and Wegner (2000) propose that people can become excessively self-critical and alarmed by their unsuccessful attempts at regulating their thoughts if they have unrealistically high expectations concerning their mental control abilities or if they magnify the significance of unwanted thoughts. They suggest that this process of attempted thought control deprives them of adequate cognitive resources, further undermining their mental-control efforts, which sets into motion a downward spiral of mental control failures. In turn, they highlight that this mental state erodes personal control and contributes to anxiety, despondency and hopelessness (Rachman, 1998; Salkovskis, 1998). This theory is further supported by Segal, Hood, Shaw and Higgins (1988) who highlight that thinking about negative aspects of the self or a negative situation serves to perpetuate rather than resolve negative feelings.

In line with ACT's theory of psychopathology, cognitive fusion results in a loss of contact with the present, which is linked to further increases in psychological inflexibility (Hayes *et al.* 1999). The authors suggest that the verbal construction of the self, the past and the future gains more control over other behaviours and prevents the person from accessing the current environment. The outcome of this is that individual values or long term ideals become less

important and a lack of clarity regarding one's own values further fuels the process of psychological inflexibility (Hayes *et al.* 1999).

1.7 Core Processes in ACT

A central feature of the ACT model is its focus on behavioural change (Hayes *et al.* 1999). The model emphasises contextual and experiential change methods to alter the function of psychological events without directly intervening with their frequency or form (Baer, 2006). This is achieved by teaching people to "just notice", accept and embrace their thoughts, feelings, sensations, memories and other private events, particularly unwanted ones (Hayes *et al.* 1999; Hayes, 2004b). In accordance with the model, the core aim is to build up and establish greater psychological flexibility with the aim of achieving contact with the present moment more fully as a conscious human being, and to change or persist with behavior when doing so serves valued ends (Hayes *et al.* 1999; Hayes, 2004b; Fletcher and Hayes, 2005). The authors suggest that this is made possible in ACT through six processes: acceptance, cognitive defusion, the self as context, contact with the present moment, values and committed action. From an RFT point of view, the authors suggest that each of these components influence linguistic processes.

According to the authors, the six components of ACT are inter-related (Hayes *et al.* 1999), and the core aim is to target psychological inflexibility. The combination of the six processes are thought to lead to psychological flexibility, which is defined by Hayes *et al.* (1999) as the ability to contact the present moment more fully as a conscious human being and to persist with change behaviour in the service of chosen values.

For the purpose of the present research only the construct of Cognitive Defusion will be outlined and discussed.

1.7.1 Cognitive Defusion

Cognitive defusion is the process of undermining the behaviour regulatory functions and literal believability of verbally entangled events (Twohig *et al.* 2005). ACT techniques aimed at the process of cognitive defusion are designed to reduce the functions of thoughts by altering the verbal contexts in which they occur (Masuda, Hayes, Sackett and Twohig, 2004). The core purpose of ACT's defusion strategies is to help the individual to see thoughts and feelings as essentially just experiences rather than a structured reality (Pankey and Hayes, 2003). Clients are taught to observe their thoughts and the process of thinking without assuming that their thoughts are true or important and without always behaving in accordance with their thought content (Baer, 2006). Greater emphasis is placed on allowing thoughts to come and go regardless of how aversive and emotionally charged they may be.

Like all ACT principles the aim is not to alter the form, frequency, or situational severity of the thoughts themselves (Hayes *et al.* 1999). From an RFT perspective, the process of cognitive defusion is aimed at increasing the likelihood of acceptance (Twohig *et al.* 2005) which, in turn, assists the individual in breaking through the usual avoidance patterns. The central aim is to allow constructive behaviour even in the presence of unwanted thoughts. Several micro-studies on cognitive defusion have been conducted to see if the process works in accordance with the theory.

Bach and Hayes (2002) examined the impact of ACT with eighty inpatients with positive psychotic symptoms. Participants were randomly assigned to either a treatment as usual (TAU) condition or to four sessions of ACT plus TAU. Patients in the ACT condition were taught to accept unavoidable events, to notice psychotic symptoms without treating them as either true or false and to identify and work toward valued goals despite their symptoms. The researchers found that participants in the ACT condition showed a rate of re-hospitalisation which was half that of the TAU rate over a four month follow up period. The authors contend that this finding was not accounted for by increased medication compliance or by a reduction in the experience of psychotic symptoms. Interestingly, Bach and Hayes (2002) found that participants in the ACT condition showed significantly higher symptom reporting: twenty two ACT patients (63%) versus eleven TAU patients (31%) admitted symptoms at follow up. However, although the ACT participants reported more symptoms, those who did so were four times more likely to stay out of hospital. Furthermore, ACT participants showed reduced believability in the literal reality of the symptoms they experienced. The authors found that no participants in the ACT condition who admitted symptoms and showed reduced believability in them were re-hospitalised. Bach and Hayes (2002) propose that acceptance and defusion processes were likely to be mediating the relationship between symptoms and re-hospitalisation. Ost (2008) identifies several methodological issues with this study. Firstly, he questions the validity of the TAU condition. In particular, he highlights that the TAU condition protocol is not specified and he also states that the authors have very little knowledge of what the condition entails because it is not subject to audio/visual recording. A further criticism is that the patients in the TAU condition receive significantly less hours of treatment compared to patients in the active treatment group. Ost (2008) argues that only one therapist is used in this study. He suggests that this study could

have been improved with more than one therapist delivering treatment in order to avoid the pitfalls of having only one therapist.

A more recent study by Gaudiano and Herbert (2006) found similar results to Bach and Hayes (2002) study. Gaudiano and Herbert (2006) randomly assigned forty psychiatric inpatients with psychotic symptoms to an enhanced treatment as usual condition (ETAU) and an enhanced treatment as usual condition plus four sessions of ACT (ETAU and ACT). The ETAU condition consisted of psychopharmacology, case management and psychotherapy on the unit. An ACT therapist also consulted with the patient's individual treatment team for approximately fifteen minutes per day. The ETAU and ACT condition consisted of the ETAU described above plus four ACT sessions focusing on the following themes: willingness as an alternative to control/controllable events, workability as a guide to coping strategies, acceptance of uncontrollable versus controllable events, and products of the mind as mental events and not facts about the self or the world. The authors found that at discharge from hospital, participants in the ETAU and ACT condition showed an overall improvement in affective symptomatology, social impairment and distress associated with hallucinations. Moreover, more participants in the ACT condition reached clinically significant symptom improvement at discharge. While four month re-hospitalisation rates were lower in the ACT group, the authors found that the effect was not statistically significant. However, they did find that participants in the ACT condition had decreases in the believability of their hallucinations during treatment. This change in believability was thought to be strongly associated with a change in distress after controlling for a change in the frequency of hallucinations (Gaudiano and Herbert, 2006).

In a study by Masuda, Hayes, Sackett and Twohig (2004), the authors tested out the impact of cognitive defusion using a technique first proposed by Titchener (1916) nearly ninety years ago. Titchener (1916,p.425) proposed that when a word is said aloud and repeated, the context required for words to have literal meaning is removed. The authors compared a defusion technique (i.e. repeating the word "milk") with a distraction task and to a thought control task on reductions in the discomfort and believability of self-relevant negative thoughts. Eight participants were firstly asked to generate self-relevant negative thoughts that they found particularly disturbing. In the thought control task participants were invited to control their negative thoughts by either confronting them, changing them to positive forms, distracting themselves from their thoughts and/or by suppressing them. Masuda and his colleagues (2004) found that repetition of negative self-referential words reduced participant's believability and negative emotional impact over and above that of the comparison conditions. However, there are several limitations to the above research. Firstly, the low number of participants raises issues of questionable power. Future research in this area could benefit from including a greater number of participants. Secondly, there is a lack of clarity about what precise strategies participants were using in the thought control condition. This makes it difficult to tease apart what functions in the thought control condition were more or less effective than the defusion technique. Thirdly, the authors do not clarify how the cognitive defusion exercise (repetition of the word "milk") is different from a distraction task. A further condition examining this issue may provide further support for cognitive defusion as a technique if found to be successful. Despite the limitations of this study, Masuda *et al's.* (2004) findings represent a piece of research that solely targets the construct of cognitive defusion.

Hayes, Bissett, Korn *et al*. (1999) examined the impact of a ninety minute ACT protocol focussing exclusively on the constructs of acceptance and defusion in a pain tolerance cold pressor task. The authors compared the ACT protocol to a CBT pain management analogue condition and to an attention placebo condition, which consisted of a discussion of a behavioural approach to pain. Thirty-two college students were randomly assigned to one of the three conditions. The acceptance and defusion protocol examined the paradoxical effects of emotional control, an attempt to undermine feelings and thoughts as reasons for actions, the workability of emotional control and defusion of thoughts and feelings from the self. The authors found no differences in the intensity of pain at post intervention. However, participants in the acceptance and defusion condition were able to keep their hand in the cold water significantly longer than participants in the other conditions at post-test. They also found that participants in the acceptance condition revealed lower levels of belief in pain-oriented reasons for action than the other groups.

Takahasi, Muto, Tada and Sugiyama (2002) replicated the procedures used in Hayes *et al's.* (1999) study above. However, they examined whether the acceptance and defusion exercises were needed in order to increase tolerance time in a cold pressor task or whether rationale alone could produce similar results. The authors randomly assigned twenty-eight participants to one of three conditions. Each condition had a different rationale. The first condition took its rationale from a lecture on the theory of ACT and brief practice about acceptance; the second condition took a rationale that contained the theory of ACT and brief practice about the adverse effects of thought suppression; the third condition was a placebo group. The second condition incorporated the following ACT exercises, the leaves on the stream mindfulness exercise (Hayes *et al.* 1999; p158-161) and the physicalizing defusion exercise

(Hayes *et al.* 1999; p.170-171). Both exercises are designed to undermine the literal impact of difficult private events. The authors found that participants in the first and second condition showed significantly increased understanding of the theory of ACT. However, they also found that participants in the acceptance-based condition that included acceptance and defusion exercises (the second condition) revealed a significantly greater tolerance of pain compared to the first and placebo condition. The authors concluded that for longer tolerance in a cold pressor task, knowledge of ACT's theory alone is not sufficient and that practice and experience are essential. One of the main concerns about Hayes *et al's*. (1999) study and Takahasi *et al's*. (2002) study is whether these findings from the cold pressor tasks can be generalised to clinical presentations (i.e. the tolerance of anxiety or depressive rumination). It is arguable that the above findings cannot be credited with external validity. Further research is required in order to provide support for the theoretical basis of cognitive defusion to a clinical population.

Within the literature Ost (2008) has provided a detailed systematic review and meta-analysis of the third wave of behavioural therapies including ACT. More specifically, he compares thirteen ACT RCT's and traditional CBT studies to assess the methodological properties of the studies, to meta-analytically assess their efficacy and to investigate whether those identified studies fulfil the criteria for empirically supported treatments (ESTs). Of the thirteen RCT's selected there were two on depression (Zettle and Hayes, 1986; Zettle and Rains, 1989), two on stress (Bond and Bunce, 2000; Dahl, Wilson and Nilsson, 2004), two on psychosis (Bach and Hayes, 2002; Gaudiano and Herbert, 2006), one on mathematics anxiety (Zettle, 2003), one on smoking (Gifford, Kohlenberg, Hayes et al. 2004), one on opiate dependence (Hayes, Wilson et al. 2004), one on trichotillomania (Woods, Wetterneck and

Flessner, 2006), one on epilepsy (Lundgren, Dahl *et al*. 2006), one on borderline personality disorder (Gratz and Gunderson, 2006) and finally one on diabetes (Gregg, Callaghan *et al*. 2007). There were 677 participants in total when these studies were combined together. Each study was evaluated on a scale, designed by Ost (2008), to rate the methodological rigour of psychotherapy outcomes studies. Several items on this scale included the clarity of the sample description, the severity/chronicity of the disorder, the representativeness of the sample and the reliability of the diagnosis in question to name but a few. Ost (2008) identified a number of methodological problems in several areas of the ACT studies including the methodological designs, the number of therapists used in the studies, treatment adherence and therapists' competence, reliability of diagnosis, sample representativeness and the follow-up methods adopted after treatment. Each of these areas will now be discussed in further detail.

Ost (2008) identified that six studies (Zettle and Hayes, 1986; Zettle and Rains, 1989; Bond and Bunce, 2000; Zettle, 2003; Dahl *et al*. 2004; Gifford *et al*. 2004) did not use a diagnostic system to diagnose participants. More specifically, he found that the proportion of studies using any diagnostic system was significantly lower in the ACT studies (54%) than in the CBT studies (100%). He also found that three studies (by Zettle and Hayes, 1986; Zettle and Rains, 1989; Gratz and Gunderson, 2006) had only female participants. Three studies (by Zettle, 2003; Gratz and Gunderson, 2006; Gregg *et al*. 2007) were found to have no follow-up at all and only two studies (by Gifford *et al*. 2004; Lundgren *et al*. 2006) reported a 1-year follow up, with a mean of 4.2 months (Ost, 2008). Ost (2008) also highlights specific issues with the number of therapists involved with some of the ACT studies. More specifically, he states that it is necessary within studies to have more than one therapist delivering treatment

in order to avoid a confounding therapist and treatment condition. However, in eight ACT studies (by Zettle and Rains, 1989; Bach and Hayes, 2002; Zettle, 2003; Gaudiano and Herbert, 2006; Woods *et al*. 2006; Gratz and Gunderson, 2006; Gregg *et al*. 2007) only one therapist was used. Four of the ACT studies did not provide any information regarding the number of therapists (Ost, 2008).

In terms of therapist adherence and therapist competence, only two of the thirteen ACT studies (by Hayes *et al*. 2004; Zettle and Rains, 1989) reported any form of adherence ratings. Ost (2008) identifies that therapist adherence ratings when delivering treatment are essential in order to verify that researchers are adhering to the treatment that they say they are delivering. Rather alarmingly, Ost (2008) also found that in terms of therapist competence ratings no ACT study reported having an independent expert on the respective treatment rating the therapists' competence when delivering the treatment.

In terms of the EST criteria, Ost (2008) found that two studies (by Bond and Bunce, 2000; Lundgren *et al*. 2006) had significantly better effects than an active psychotherapy treatment condition. He also found that four other studies (by Bach and Hayes, 2002; Dahl *et al*. 2002; Gratz and Gunderson, 2006; Gregg *et al*. 2007) were found to be significantly better than a treatment as usual (TAU) condition. However as previously outlined, Ost (2008) found a number of methodological problems associated with each of these studies and he therefore concludes that the individual studies do not fulfil the EST criteria.

Ost's (2008) paper reveals that there are significant methodological weaknesses within some of the ACT research and he also concludes that in comparison to CBT studies, the ACT RCT studies aforementioned employ a research methodology that is significantly less stringent. There is substantial evidence within Ost's (2008) paper to support this finding. However, one of the shortcomings of Ost's (2008) article is that it fails to take into account that ACT is a relatively new form of therapy and, at this stage it has a less well developed research base compared to CBT. One of the possible disadvantages of being a 'newer form of therapy' is that availability for funding to conduct research may be considerably less. Ost (2008) highlights that the ACT studies had an equal number of grant funded studies as the CBT studies but the size of these grants are not detailed in his paper. Therefore, the conclusions drawn from Ost's (2008) study could potentially be biased if there was a discrepancy in funding between the ACT and CBT studies reviewed. Nevertheless, Ost's (2008) paper highlights to both ACT therapists and ACT researchers potential areas to improve on when conducting future research in this area.

The aforementioned studies on cognitive defusion and indeed the ACT RCT studies detailed in Ost 's (2008) study could be further substantiated by a tool that specifically measures how cognitively fused or cognitively defused one is with there thought content. Within the literature there is currently no specific measurement of ACT's constructs of cognitive fusion and cognitive defusion.

1.8 Constructs and Clinical Interventions Related to ACT's Construct of Cognitive Defusion

1.8.1 Decentering

In recent years other psychological concepts that are related to the construct of cognitive defusion have emerged (Safran and Segal, 1990). Decentering has been defined by Safran and Segal (1990) as the ability to "step outside of one's immediate experience, thereby changing the very nature of that experience" (p.117). It has been conceptualized as the ability to observe one's thoughts and feelings as temporary events in the mind (Fresco, Segal, Buis and Kennedy, 2007).

A number of treatments have been developed with a central focus on teaching patients how to interact with their thoughts less literally such as metacognitive strategies (Wells, 2000) and mindfulness procedures (Segal, Williams and Teasdale, 2002).

1.8.2 Meta-Cognition

Meta-cognition is a form of mental processing that can be defined in a number of ways. Several researchers have described it as cognitive activity in which other cognitive activities are the target of reflection (Yussen, 1985), beliefs and attitudes held about cognition (Toneatto, 2002) and the ability to monitor, control, and organize mental activity (Shimamura, 1996). Flavell (1979) defines metacognition as "knowledge and cognition

about cognitive phenomena" (p.906). Flavell (1979) distinguished between metacognitive knowledge and experience. He defined metacognitive knowledge as "knowledge or beliefs about what factors and variables act and interact in what ways to affect the course and outcome of cognitive enterprises" (p.907). The latter he defines as "any conscious cognitive or affective experiences that accompany and pertain to any intellectual enterprise" (p.906). Flavell (1979) proposes that the two processes (knowledge and experience) of metacognition are not distinct, but are a "partially overlapping set" (p.908).

Teasdale, Moore, Hayhurst *et al*. (2002) also draw a distinction between metacognitive knowledge and metacognitive awareness. Metacognitive awareness is defined as "the process of experiencing negative thoughts and feelings within a decentered perspective" (p.276). The authors refer to this process as the extent to which thoughts are experienced as thoughts rather than as aspects of the self or direct reflections of truth. Metacognitive knowledge refers to "beliefs about cognitive phenomena stored in memory as propositional facts in much the same way as other fact whereas metacognitive insight refers to actually experiencing thoughts as thoughts in the moment they occur" (p.286).

1.8.3 Mindfulness

The concept of meta-cognition described above is congruent with the definition of what has been referred to as mindfulness (Gardner and Moore, 2007). Mindfulness has been defined as "paying attention in a particular way; on purpose, in the present moment, and non-judgementally" (Kabat-Zinn, 1994, p.4). The development of mindfulness entails non-judgemental and non-evaluative attention to the present reality, which includes both external

and internal processes. External and internal events that enter one's awareness are noticed but not evaluated as good, bad, right, wrong, helpful or unhelpful (Kabit-Zinn, 1994). Teasdale, Segal and Williams (1995) suggest that the aim is to see thoughts simply as thoughts and not absolute realities to which individuals must respond. The process of mindfulness is thought to break down the literal belief in one's thoughts and internal rules, which then enhances the individual's sensitivity to cues and contingencies in the environment (Hayes, Follette and Linehan, 2004). This heightened sensitivity is considered by the authors to lead to greater behavioural flexibility.

There is increasing evidence for the utility of mindfulness training as a clinical intervention. As a technique, mindfulness has been used as a component in numerous therapeutic interventions targeting a plethora of clinical problems including borderline personality disorder (Linehan, 1993), stress and anxiety (Kabat-Zinn, 1990) and recurrent depression (Segal *et al.* 2002).

Mindfulness-Based Cognitive Therapy (MBCT) (Segal *et al.* 2002) provides evidence that it is possible to alter the function of thoughts without first altering their form. MBCT integrates the principles of cognitive therapy with meditative practices and attitudes based on the cultivation of mindfulness (Segal *et al.* 2002). The authors suggest that when patients with a history of relapses into depression are taught to practise mindfulness meditation, these patients learn to become aware and identify their negative moods, which for them automatically lead to negative thoughts and precipitate relapse. The goal of MBCT is to increase awareness of moment-to-moment experience and to bring attention to the present

(Williams, Teasdale, Segal and Soulsby, 2000). The authors suggest that the attitude of non-judgement and the premise that mental events are only an aspect of the self and not synonymous with the self is thought to prevent the escalation of rumination on negative thought content.

Research studies within the literature support the use of MBCT. Two randomised controlled clinical trials (Ma and Teasdale, 2004; Teasdale, Segal, Williams, Ridgeway, Soulsby and Lau, 2000) support the efficacy of MBCT in preventing depressive relapse. Teasdale *et al.* (2000) found that MBCT significantly reduced the rates of relapse for individuals who had experienced three or more prior episodes of depression, 40% of individuals relapsed in this group compared to 66% in the treatment as usual group. Using identical methodology to Teasdale *et al's.* (2000) study, Ma and Teasdale (2004) replicated the findings that MBCT reduced rates of relapse for individuals with a history of depression. They found that only 36% of patients relapsed in the MBCT condition compared to 78% relapse rate of patients in the treatment as usual condition.

Teasdale's Differential Activation Hypothesis (DAH) (Sheppard and Teasdale, 1996; Lau, Segal and Williams, 2004) has been put forward to account for the mediating mechanisms in MBCT for depression (Segal *et al.* 2002). The model proposes that transient negative moods trigger automatic negative thought patterns, which can spiral and trigger depressive relapse. The DAH assumes that while all individuals experience dysphoria when faced with negative events, only individuals who are vulnerable to depression will demonstrate changes in cognitive functioning. Teasdale (1985) suggests that non-vulnerable individuals are expected

to demonstrate self-soothing strategies which allow their affect to return to normal levels, whereas vulnerable individuals are expected to demonstrate negative cognitive functioning. He proposes that in vulnerable individuals, a dysphoric state is predicted to lead to the activation of sad-emotion "nodes", which in turn activates a network of other emotion nodes. Teasdale (as cited in Lau, Segal and Williams, 2004) postulates that this network activation is then expected to increase the accessibility of sad thoughts and related negative constructs, which in turn biases a range of cognitive processes including attention, memory, and future expectations. The theory predicts that depressed or sad individuals will remember information consistent with their mood.

Hayes and Luoma (2003) acknowledge that decentering, meta-cognitive strategies and mindfulness are concepts that are strongly related to the processes underlying cognitive defusion. The authors acknowledge that the exact dividing line, at this stage, remains unclear. Nevertheless, it would seem that the underlying principles of cognitive defusion and in particular the concepts of decentering and mindfulness have similar properties and functions. This is captured in the number of related measures that currently exist within the literature that bear resemblance to the process of cognitive defusion.

1.9 Measures of Constructs Related to Cognitive Defusion

1.9.1 Measure of Acceptance

The Acceptance and Action Questionnaire (AAQ) developed by Hayes, Strosahl, Wilson *et al*. (2004) incorporates items pertaining to the constructs of cognitive fusion and cognitive defusion.

The Acceptance and Action Questionnaire (AAQ) is currently the only assessment tool that measures the construct of experiential avoidance. The questionnaire is often referred to as a single measure of experiential avoidance. However, the authors propose that the measure incorporates a general measure of several ACT processes that target links between experiential avoidance and excessively negative evaluations of private experience, inaction, literalness of thought and the need for cognitive and emotional control (Hayes *et al.* 2004; Barnes-Holmes, Cochrane, Barnes-Holmes *et al*. 2004).

There are two validated versions of the AAQ. Bond and Bunce (2003) developed a 16 item version that consists of two factors. One factor was found to measure acceptance and mindfulness and the other factor was found to assess values-based action. Both factors loaded onto a second-order factor, which the authors termed psychological flexibility. The second version of the AAQ consists of ten items and measures the general factor of psychological flexibility (Hayes *et al.* 2004). Both versions of the AAQ were found to have adequate criterion-related, predictive and convergent validities.

There is support within the literature from correlations between the AAQ and a variety of other assessment measures. Hayes *et al.* (2004) examined the relationship between the AAQ and the related concepts using the White Bear Suppression Inventory (WBSI, Wegner and Zanakos, 1994), the Thought Control Questionnaire (TCQ; Wells and Davies, 1994), the Dissociative Experiences Scale (DES; Bernstein-Carlson and Putnam, 1986), subscales from the Ways of Coping Questionnaire (WOC; Folkman and Lazarus, 1988), the Post-traumatic Stress Diagnostic Scale (PDS; Foa, 1995) and the Impact of Events Scale (IES; Foa, Riggs, Dancu & Rothbaum, 1993). The authors found that the AAQ correlated significantly although not strongly with all these measures.

Hayes, Luoma, Bond, Masuda and Lillis (2006) examined the relationship between the AAQ and various quality of life questionnaires including psychopathology (e.g., depression, anxiety, post-traumatic stress, trichotillomania), stress, pain, job performance and negative affectivity. The authors integrated twenty-seven individual studies, involving 5616 participants, into a meta-analysis. Correlations established with a greater number of people were given more weight in calculating the average "effect size" using the Pearson product-moment correlation coefficient (r) as the metric. The overall data set produced sixty-seven correlations between these two sets of variables. The authors found that the weighted effect size of these correlations was 0.42 (95% confidence interval: 0.40 – 0.44).

Hayes *et al.* (2006) also investigated the relationship between the AAQ and the General Health Questionnaire (GHQ; Goldberg, 1978). They combined three studies by Bond and Bunce (2000, 2003) and Donaldson-Feilder and Bond (2004) and found that higher levels of

psychological flexibility were associated with a lower probability of having a psychiatric disorder, as measured by the GHQ. The authors found that the relationship between the AAQ and the GHQ was of a medium size: 0.40 (95% confidence interval: 0.34 – 0.45).

In a further examination of the AAQ Hayes *et al.* (2006) explored the relationship between the AAQ with either 1st Version or 2nd Version of the Beck Depression Inventory (BDI) (BDI: Edition 1: Beck, Ward, Mendelson, Mock and Erbaugh, 1961; Edition 2: Beck, Steer and Brown, 1996). The authors combined eight studies (by Bond and Bunce (2000); Dykstra and Follette (1998); Forsyth, Parker and Finlay (2003); Gold, Marx and Lexington, (2007); Pistorello (1998); Plumb, Orsillo and Luterek (2004); Polusny, Rosenthal, Aban and Follette (2004); Strosahl, Hayes, Bergan and Romano (1998)) and found an effect size of 0.50 (95% confidence interval: 0.46 – 0.54) when correlations between depressed mood and psychological inflexibility were aggregated in the meta-analysis.

In a further analysis, Hayes *et al.* (2006) combined three studies by Cook (2004); Polusny, Rosenthal, Aban and Follette (2004); Toarmino, Pistorello and Hayes (1997) to investigate the association between the AAQ and the Symptom Checklist-90-R (SCL-90R; Derogatis, 1994), which assesses various indicators of mental ill health. The authors found that these variables produced a large effect size of 0.53 (95% confidence interval: 0.47 – 0.58).

Bond and Bunce (2003) examined the longitudinal effects of psychological acceptance on mental health, job satisfaction and work performance amongst four hundred and twelve customer service centre employees in a UK financial organization. As measured on the 16-

item AAQ, the authors found that higher levels of acceptance predicted better mental health and improved job performance.

Ossman, Wilson, Storaasli and McNeill (2006) examined the impact of a group treatment protocol based on ACT for socially anxious persons. Of the twenty-two participants in the group treatment, which consisted of ten sessions, twelve participants completed the treatment. Using the Social Phobia and Anxiety Inventory (SPAI; Turner, Beidel and Dancu, 1996; Turner, Beidel and Stanley, 1989) and the AAQ, Ossman *et al.* (2006) found significant decreases on both measures at post-treatment and follow-up. More specifically, they found that participants who had completed the group treatment had significantly higher ratings of effectiveness in living, specifically pertaining to social relationships, at follow-up. They also found that participant symptoms decreased despite not being treatment targets. The authors account for this by suggesting that symptom improvement may result from an increased willingness to both experience aversive emotions and engage in social behaviours that are consistent with what the participants valued but previously avoided. There are several limitations to the above study. The authors do not explain why one participant declined treatment and nor do they explain why nine participants dropped out of treatment. It would appear that the authors made no attempt to explore the reasons as to why those participants did not wish to continue with the treatment. The reduction in participant numbers has a significant impact on the sample size and it is arguable whether the authors can derive any conclusive findings from this research. The absence of a formal control group is also questionable.

However, when reviewing the content of the AAQ it is clear that while some of the questions make reference to Hayes *et al's.* (1999) construct of cognitive fusion and cognitive defusion, the questionnaire does not reflect the constructs as a whole.

1.9.2 Measures of Meta-cognition

There are currently three measures that assess meta-cognitive processes. Cartwright-Hatton and Wells (1997) developed the Meta-Cognitions Questionnaire (MCQ), a self-report measure to assess beliefs about worry. The MCQ is a 65 item scale which assesses five factors. The first one (positive beliefs about worrying) include items about beneficial outcomes of worrying for planning and problem solving (i.e. "*worrying helps me to avoid a disastrous situation*" or "*worrying helps me to plan the future more effectively*". The second factor reflects the belief that worry must be controlled along with the belief about the uncontrollability of worry. Items include "*I find it difficult to control my thoughts*" or "*worrying thoughts enter my head against my will*". The third factor is linked to a lack of cognitive confidence for one's memory and attentional abilities. A sample of the items include "*my memory can mislead me at times*" or "*I have difficulty keeping my mind focused on one thing for a long time*". The fourth factor is related to negative beliefs about worry concerning the uncontrollability and danger of thoughts (i.e. "*if I did not control a worrying thought, and then it happened, it would be my fault*" or "*I could be punished for having certain thoughts*". The fifth factor is related to cognitive self-consciousness. Items include "*I think a lot about my thoughts*" or "*I pay close attention to the way my mind works*". The internal reliability of the MCQ ranges from .72 (factor 5) to .89 (factor 2). The inter-

correlations between the factors ranged from r = .08 to r = .43. The test-retest reliability of the total scale at five weeks was very high, r = .94.

The Metacognitive Awareness Questionnaire (MAQ) was developed by Teasdale, Scott, Moore, Hayhurst, Pope and Paykel (2001). The MAQ is a 9-item scale that was developed for patients to report whether or not they saw their negative thoughts and feelings when depressed as reflecting actual realities. Items from the MAQ include "*I can't trust my judgements about myself when I feel down*", "*When I am depressed, I am aware that there could be other ways of viewing the situation*" and "*When something has upset me, I try to put my judgements on hold for a while*". Responses range from 1 to 7)1 = totally agree; 7 = totally disagree), and higher scores reflect greater metacognitive awareness. The Cronbach's alpha for the scale indicated .71.

The Meta-cognitive Awareness Inventory (MAI) developed by Schraw and Dennison, (1994) is a 52-item inventory that measures adults' meta-cognitive awareness. The scale consists of two categories, knowledge of cognition and regulation of cognition. Knowledge about cognition includes three subprocesses "declarative knowledge (i.e., knowledge about the self and about strategies), procedural knowledge (i.e., knowledge about how to use strategies) and conditional knowledge (i.e., knowledge about when and why to use strategies)" (Schraw and Dennison, 1994, p.460). Regulation of cognition includes planning, information management strategies, comprehension monitoring, debugging strategies and evaluation (Schraw and Dennison, 1994). Items from the knowledge of cognition subscale include "*I find myself using helpful learning strategies automatically*", "*I learn more when I am interested in the*

topic" and "*I use different learning strategies depending on the situation*". Items from the regulation of cognition include "*I set specific goals before I begin a task*", "*I draw pictures or diagrams to help me understand while learning*", "*I consider several alternatives to a problem before I answer*", "*I ask myself if there was an easier way to do things after I finish a task*" and "*I re-evaluate my assumptions when I get confused*". The Cronbach's alpha for the scale was .90.

Further questionnaires measuring the concept of decentering have also been developed that bear resemblance to the construct of cognitive defusion.

1.9.3 Measures of Decentering (Mindfulness)

More recently, several questionnaires have been developed that incorporate themes of decentering from thoughts and feelings.

The Experiences Questionnaire (EQ) developed by Fresco, Moore, Dulmen *et al*. (2007) was designed as a practical measure of the primary psychotherapy process in MBCT. The authors refer to the EQ as a self-report questionnaire designed to measure both decentering and rumination in the context of mood disorders. The authors derived an eleven item decentering factor using exploratory and confirmatory factor analysis in two consecutive large samples of college students. The factor structure was further confirmed in a sample of patients with remitted depressive disorder. Sample items from the EQ include "*I can observe unpleasant feelings without being drawn into them*" and "*I am better able to accept myself as I am*" The measure showed good internal consistency, ranging from .81 to .90.

The Southampton Mindfulness Questionnaire (SMQ) developed by Chadwick, Hember, Symes, Peters, Kuipers and Dagnan (2008) was designed to measure the relationship between distressing thoughts and images that are central to the phenomena found in clinical disorders (see p.68 for further information about the psychometric properties of the questionnaire).

1.9.4 Summary of Measures Related to the Construct of Cognitive Defusion

While it is clear that the aforementioned measures clearly relate to some of the principles underlying the construct of cognitive defusion, it is also apparent that the measures do not fully capture the constructs of cognitive fusion or cognitive defusion as defined by Hayes *et al.* 1999). The AAQ (Hayes *et al.* 2004) includes some items pertaining to both constructs. However the questionnaire predominantly targets ACT's constructs of acceptance and experiential avoidance. The MCQ (Cartwright-Hatton and Well's, 1997) is a measure that assesses meta-cognitive belief but it is specific to generalized anxiety disorder. While the MAQ (Teasdale *et al.* 2001) assesses awareness of cognition, the scale is specific to depression. The MAI (Schraw and Dennison, 1994) is pertains to learning performance. The EQ (Fresco *et al.* 2007) captures the concept of decentering from thoughts and rumination in the context of mood disorders but the measure has been predominantly developed to measure the effectiveness of MBCT. Finally, the SMQ (Chadwick *et al.* 2008) primarily assesses mindful relating to psychotic phenomenon particularly voices. While the above measures are similar to Hayes *et al.* (2006) constructs of cognitive fusion and cognitive defusion, the questionnaires do not adequately assess these constructs. In addition there is need for a generic measure that can be used across any adult populations for individuals either suffering from or without psychological disorders.

1.10 The Present Study

The present study describes the development and evaluation of a self-administered pencil and paper questionnaire to measure Acceptance and Commitment Therapy's constructs of cognitive fusion and cognitive defusion. There would be numerous benefits to creating such a valid and reliable tool. From a psychometric standpoint it would be useful to have a measure that can isolate constructs that address the aspects of cognitive fusion and cognitive defusion identified by Hayes *et al.* (1999). As cognitive fusion has been postulated as a factor in psychopathological processes, it appears useful to have a questionnaire that measures this directly. The questionnaire could be used in clinical practice to determine how cognitively fused or cognitively defused one is with their mental content. The development of such a measure could be used as a pre and post therapy tool to measure the effectiveness of ACT and other therapies including MBCT, CT and REBT to name but a few. The tool could be used in future research to develop the research base on cognitive fusion and cognitive defusion because at present research focusing solely on this construct is relatively sparse. Finally, by creating such a measure and establishing the measure to be both reliable and valid will further serve to increase the theoretical structure of ACT, in particular the area of cognitive fusion and cognitive defusion as well as adding to its expanding research base.

1.11 Research Aims and Hypotheses

1.11.1 Research Aims

The aim of the research was to create a valid and reliable tool that accurately measures the constructs of cognitive fusion and cognitive defusion. To date, as far as the researcher is aware there, is no well-validated tool to identify these constructs. The study evaluated the psychometric properties of the 42-item pool (CFQ).

The study examined the validity of the CFQ. The study tested content and construct validity associated with the questionnaire. Content validity refers to the extent to which the items in a scale sample the universe of behaviours that the test is designed to sample (Guion, 1980). This aspect of validity was evaluated by inspecting the range of items that significantly loaded on the factor or factors (Cronbach and Meehl, 1955). Content validity was also evaluated in the construction of the questionnaire. The researcher collaborated with and sought opinions from experts in the field of ACT in the development of items for the scale.

Construct validity refers to the extent to which the instrument measures what it purports to measure (Guion, 1980). Construct validity is measured through convergent and divergent validity of a scale. A scale demonstrates convergent validity if it is related to an alternative measure of the same or similar construct (Guion, 1980). Divergent validity is shown when a scale is poorly related to measures of dissimilar constructs. Convergent validity of the CFQ was examined by the patterns of correlations between the CFQ and participant responses to measure of life satisfaction, a measure of experiential avoidance, a measure concerning

individual's beliefs about worry and a questionnaire measuring mindful responding to unpleasant thoughts and images.

1.11.2 Research Hypotheses

- Hypothesis One - It was expected that those participants that are more fused as measured on the CFQ would have lower levels of life satisfaction as measured by the Dieners Satisfactions with Life Scale (SWLS) (Diener, Emmons, Larsen and Griffin, 1985) compared to participants who have low levels of cognitive fusion.

- Hypothesis Two - It was also expected that participants that are more fused would score higher on avoidance as measured by the Acceptance and Action Questionnaire (AAQ-II) (Hayes *et al.* 2004).

- Hypothesis Three – It was expected that participants with higher levels of cognitive fusion would score higher on the TCQ (Wells and Davis, 1994).

- Hypothesis Four - It was expected that participants that are less fused would score higher on the SMQ (Chadwick *et al.* 2008).

2 CHAPTER TWO: METHODOLOGY

2.1 Design

A cross sectional research design was employed in Study One and Study Two. The purpose of the research was to develop a scale to measure Hayes *et al's.* (1999) constructs of cognitive fusion and cognitive defusion. For the purposes of Study One and Study Two all participants completed the questionnaires once.

2.1.1 Construction of the CFQ

A pool of 44 items was drawn from reading about the constructs of cognitive fusion and cognitive defusion, from clinical experience and from (Continuing Professional Development (CPD)) courses in ACT. Close attention was paid to the "basic principles of item writing", as outlined by Clark and Watson (1995, p.312). Particular focus was placed on simple, straightforward language, exact phrasing of items and the avoidance of "double barrelled" items (Clark and Watson, 1995, p.312) that might assess more than one construct. Members of the ACT Special Interest Branch of the BABCP and the local ACT Interest Group were consulted and asked to review the initial questionnaire. See appendix 1 for a list of the initial items and the initial questionnaire. Eleven members of the ACT Special Interest Branch of the BABCP and three members of the local ACT Interest Group were invited to rate items for representativeness of the constructs of cognitive fusion and cognitive defusion on a four point Likert scale ranging from "*not at all*", "*a little*", "*moderately*" and "*highly*". All of the people consulted were ACT therapists and researchers with considerable training and experience in ACT. Of the fourteen members consulted, nine members responded with individual ratings and qualitative comments. Collectively, the qualitative comments made

reference to the wording of several of the items and the conceptualisation of some of the items.

Individual item ratings of representativeness were entered into an SPSS 13 Database for exploration. The data's frequencies, means and modes were examined. Individual items that were rated as either a 3 "*moderately*" or 4 "*highly*" were selected first. Five items met this criteria. The items are listed below,

10. "*I tell myself that I shouldn't be thinking the way I'm thinking*"
15. "*I make judgements about whether my thoughts are good or bad*"
16. "*I think some thoughts are bad and inappropriate*"
19. "*I get upset with myself for having certain thoughts*"
21. "*I feel like my thoughts need to change before I can have a good life*"

Items that had a mean rating of 3.5 or above (indicating a mean high level of agreement) were then examined. Eight items met this criterion. The items are listed below,

10. "*I tell myself that I shouldn't be thinking the way I'm thinking*"
13. "*I get very caught up in my thought processes*"
15. "*I make judgements about whether my thoughts are good or bad*"
16. "*I think some thoughts are bad and inappropriate*"
19. "*I get upset with myself for having certain thoughts*"
21. "*I feel like my thoughts need to change before I can have a good life*"
24. "*I tend to get very entangled in my thoughts*"

41. "*I see my thoughts as facts*"

An examination of the items that had a modal rating of 4 (indicating that the majority of raters thought that the item was highly representative) were then explored. This generated fifteen items. The items are as follows,

3. "*My thoughts cause me distress or emotional pain*"

4. "*Even when my mind is going over and over the same thing, I understand that thoughts are just thoughts*"

7. "*I place great importance on my thoughts*"

10. "*I tell myself that I shouldn't be thinking the way I'm thinking*"

12. "*I am able to distance myself from my thoughts as I know that they will become less important eventually*"

13. "*I get very caught up in my thought processes*"

14. "*I can see that my thoughts are just thoughts*"

15. "*I make judgements about whether my thoughts are good or bad*"

19. "*I get upset with myself for having certain thoughts*"

20. "*I find it difficult to ignore certain thoughts*"

24. "*I tend to get very entangled in my thoughts*"

25. "*I am able to stand back from thought processes that are overwhelming*"

27. "*Even when I'm upset I am able to see that some thoughts may not be true*"

40. "*My thoughts just come and go and I'm not too attached to them*"

41. "*I see my thoughts as facts*"

Items that had a modal rating of 3 or 4 (indicating that the majority of raters considered the items to be moderately or highly representative of cognitive fusion and cognitive defusion) were then examined. Thirty two items met this criteria. The items are as follows,

1. "*I get so caught up in my thoughts that I don't see other people's point of view*"

3. "*My thoughts cause me distress or emotional pain*"

4. "*Even when my mind is going over and over the same thing, I understand that thoughts are just thoughts*"

5. "*Even when I am mistaken about a situation, I find it hard to let go of how I'm thinking about it*"

7. "*I place great importance on my thoughts*"

8. "*I find it hard to get things out of my mind*"

10. "*I tell myself that I shouldn't be thinking the way I'm thinking*"

12. "*I am able to distance myself from my thoughts as I know that they will become less important eventually*"

13. "*I get very caught up in my thought processes*"

14. "*I can see that my thoughts are just thoughts*"

15. "*I make judgements about whether my thoughts are good or bad*"

16. "*I think some thoughts are bad and inappropriate*"

19. "*I get upset with myself for having certain thoughts*"

20. "*I find it difficult to ignore certain thoughts*"

21. "*I feel like my thoughts need to change before I can have a good life*"

23. "*I am able to move on from my thoughts*"

24. "*I tend to get very entangled in my thoughts*"

25. "*I am able to stand back from thought processes that are overwhelming*"

26. "*I am able to move on from certain thoughts relatively easily*"

27. "*Even when I'm upset I am able to see that some thoughts may not be true*"

30. "*When I find myself dwelling on things, I am able to move on relatively quickly*"

31. "*I do not brood over past events*"

32. "*I do not grasp on to my thoughts and pick them apart*"

36. "*I spend very little time analysing situations*"

37. "*My thoughts must be right before I act*"

38. "*I find it easy to switch off from my thoughts*"

39. "*I find it easy to view my thoughts from different angles*"

40. "*My thoughts just come and go and I'm not too attached to them*"

41. "*I see my thoughts as facts*"

42. "*There are certain areas in my life where my thoughts are rigid or inflexible*"

43. "*I never act against my thoughts*"

44. "*I very rarely get caught up in thinking*"

The qualitative responses were then examined. Items 5, 12, 25, 30, 31, 39 and 41 were reworded to clarify the items conceptual clarity. The items reworded are as follows,

5. "*It's such a struggle to let go of upsetting thoughts even when I know that letting go would be helpful*" translates as item 14 on the F-42 (see Appendix 2)

12. "*Even when I am having distressing thoughts, I know that they may become less important eventually*" translates as item 3 on the F-42 (see Appendix 2)

25. "*I am able to stand back from thoughts that are overwhelming me*" translates as item 27 on the F-42 (see Appendix 2)

30. "*When I catch myself dwelling on things, I am able to let go of dwelling relatively quickly*" translates as item 36 on the F-42 (see Appendix 2)

31. "*I brood over past events*" translates as item 37 on the F-42 (see Appendix 2)

39. "*I find it easy to view my thoughts from a different perspective*" translates as item 9 on the F-42 (see Appendix 2)

41. "*My thoughts are facts*" translates as item 13 on the F-42 (see Appendix 2)

It was also agreed that items 13 and 24 were too similar. As item 24 was rated as more representative, an agreement was reached that item 13 would be omitted on the grounds of repetition. The decision was reached to omit item 4 and item 14 because one member of the Expert Reference Group suggested that from his experience on developing the Acceptance and Action Questionnaire (AAQ; Hayes *et al.* 2004), items such as "*thoughts are just thoughts*" were not responded to in a reliable way by participants and showed low validity in terms of low factor loadings (Personal Communication with F. Bond 17th April 2008). It was proposed that the concept would be too alien for many people. Items 1, 7, 8, 20, 23, 26, 27, 32, 36, 37, 38, 42, 43, and 44 were also omitted as they were considered to be conceptually unclear.

After considering the qualitative comments that were received from members of the Expert Reference Group, the decision was reached to include the following items below even though they had not appeared in our initial analysis.

17. "*I over-analyse situations to the point where it's unhelpful to me*"

33. "*My mind is capable of having upsetting thoughts, but I can live with them*"

During the item development stage it became apparent that a similar research project was occurring for an MPhil at the University of Southampton. The researcher and her Academic Supervisor collaborated and shared items with the other researchers and the researcher agreed to incorporate some of the other researcher's items in this study. The decision was reached to combine twenty-four items with the aforementioned items. The items selected were,

4. "*I find myself preoccupied with the future or the past*"

6. "*Even when I'm having upsetting thoughts, I can see that those thoughts may not be literally true*"

12. "*I do not over-analyse my thoughts*"

16. "*I get so caught up in my thoughts that I am unable to do the things that I most want to do*"

18. "*I can watch my thoughts from a distance without getting caught up in them*"

19. "*There are certain areas in my life where my thoughts are rigid or inflexible*"

20. "*I get so caught up in my thoughts that I don't see other people's point of view*"

21. "*I am able to do what's important in my life even when I have upsetting thoughts*"

22. "*I struggle with my thoughts*"

23. "*I am my thoughts*"

24. "*I can be aware of my thoughts without necessarily reacting to them*"

25. "*I take the content of my thoughts to be the truth*"

26. "*If I think I cannot do something then I will not try to do it*"

28. "*I get so caught up in my thoughts that I forget what I'm actually doing*"

29. "*I tend to react very strongly to my thoughts*"

30. "*I am able to move on from troubling thoughts relatively easily*"

31. "*My thoughts are who I am*"

32. "*I believe the thoughts that pop into my head*"

34. "*I need to control the thoughts that come into my head*"

35. "*Once I've thought about something upsetting its difficult for me to focus on anything else*"

38. "*I can do difficult things even if my thoughts say they are impossible to do*"

39. "*I can think about something stressful without getting stressed*"

40. "*There is more to me than my thoughts*"

42. "*Its possible for me to have negative thoughts about myself and still know that I am an OK person*"

Final visual inspection of the questionnaire revealed that nothing was tapping into future cognitive fusion or worry. The following item was therefore added to the questionnaire,

41. "*I worry a great deal*"

Every third item on the scale was included as a cognitive defusion item and the other items cognitive fusion items. This was done to try and balance the cognitive fusion and cognitive defusion items and to make scoring of the questionnaire easier.

The final scale therefore consisted of 42 items (16 cognitive defusion items and 26 cognitive fusion items). A Likert scale was adopted because of ease of construction, intuitive appeal, adaptability and usually good reliability (Babbie, 1998; Nunnally, 1978). Items were rated on a 7-point Likert Scale (1 = 'never true'; 2 = 'very seldom true'; 3 = seldom true'; 4 =

'sometimes true'; 5 = 'frequently true'; 6 = 'almost always true'; 7 = 'always true') for suitability.

Agreement with a positively stated proposition is hypothesized to reveal the underlying construct. The decision was reached to name the scale the 'Cognitive Fusion Questionnaire' (CFQ – 42 items). See appendix 2 to review the scale.

2.2 Sample Size Estimations

2.2.1 Study 1

Sample size is important for all studies but it has particular impact upon factor analysis. Within the literature, a wide range of recommendations regarding sample size in factor analysis have been made. Comrey and Lee (as cited in MacCallum *et al.* 1999, p.84) propose the following guidance rules on sample size: 100 = poor, 200 = fair, 300 = good, 500 = very good, 1,000 or more = excellent. They further suggested that researchers, whenever possible, should aim to obtain samples of 500 or more observations. Gorsuch (as cited in MacCallum *et al.* 1999) recommend five subjects per item, with at least 100 subjects. MacCallum, Widaman, Zhang and Hong (1999) suggest that these recommendations are usually stated in terms of either the minimum sample size (*N*) for a particular analysis or the minimum ratio of *N* to the number of variables, *p* (i.e. the number of survey items being subjected to factor analysis). Guilford (as cited in MacCallum *et al.* 1999) suggest that *N* should be no less than 200 cases while Cattle (as cited in MacCallum *et al.* 1999) claimed the minimum desirable *N* to be 250. Lawley and Maxwell (1963) suggest fifty-one more cases than the number of variables.

When reviewing the second recommendation (i.e. the subjects-to-variables (STV) ratio, Everitt (1975) propose that there should be at least ten cases for each item in the instrument being used. Bryant and Yarnold (as cited in Grimm & Yarnold, 1995) and Gorsuch (1983) suggest that the STV should be no lower than five. Cattell (1978) recommends three to six subjects per item. Others have suggested five or ten times the number of observed variables (Fayers and Machin, 2007).

Froman (2001) proposes that in factor analysis, small sample sizes are likely to yield spurious results that elude replication. The author suggests that this occurs in two forms that are informally referred to as "rogue" or "splinter" factors. Rogue factors are defined as those factors that are specific to one data set that may result from bias in a small sample limiting how representative it is of the larger population (Froman, 2001). Splinter factors are viewed as smaller groupings of items that constitute a larger factor that has "splintered" when tested on a small sample. The author argues that having a sufficiently large sample helps to avoid rogue and splinter factors.

In support of this, MacCallum *et al.* (1999) suggest that as the sample size increases, sampling error is reduced, factor analysis solutions become more stable and more reliably produce the factorial structure of the population. Costello and Osborne (2005) empirically tested the effect of sample size on the results of factor analysis. They found that larger samples tended to produce more accurate solutions.

When reviewing the above it would appear that there are no definitive guidelines about how big a sample size must be to produce meaningful factor analysis. Based on scientific and pragmatic concerns, the researcher decided the number of participants based on Bryant and Yarnold (as cited in Grimm & Yarnold, 1995) and Gorsuch (1983) suggestion that the STV should be no lower than 5. Therefore, the number of participants needed, was calculated as five times the number of observed items (i.e. 42) in the questionnaire. The researcher needed to obtain a minimum of 210 participants. According to Comrey and Lee's (as cited in MacCallum *et al.* 1999,p.84) guidance rules a sample size of 210 would be categorised as "fair".

2.2.2 Study 2

Principal Component Analysis was used in study 2 to further establish the structural validity of the CFQ. The above sample size requirements were utilized in study 2. The researcher adopted Bryant and Yarnold (1995) and Gorsuch's (1983) suggestion that the STV should be no lower than 5. The number of participants needed, was calculated as five times the number of observed variables (i.e. 28) in the questionnaire. Therefore, the researcher needed to obtain a minimum of 140 participants.

The purpose of study 2 was also to establish the external validity component of the CFQ. Correlational analysis with comparison measures were utilized for this purpose. The necessary sample size calculation was based on Cohen's (1992) recommendations for correlation. The sample size calculation estimated to detect medium size correlations with 80% power at the 5% significance level was 45 participants.

2.3 Participants

2.3.1 Study 1; Undergraduate and Postgraduate Student Cohort; Adult Participants

This group comprised Undergraduate Psychology students and Postgraduate Clinical Psychology students studying at Edinburgh University and a community sample. The community sample was invited to participate by virtue of there being colleagues and friends of the researcher. The researcher distributed questionnaires to her acquaintances who, in turn, invited their friends and family to participate. This method is often referred to as 'snowball sampling' (Goodman, 1961). A total of 425 individuals took part in study 1. The participant's ages ranged from 17 to over 55. In total, 283 females and 142 males participated in study 1.

2.3.2 Study 2; Undergraduate Student Cohort and Postgraduate Student Cohort

This group comprised Undergraduate Psychology students and Postgraduate Clinical Psychology Students studying at Edinburgh University. In both samples a different set of participants were selected from study 1. A total of 167 individuals took part in study 2. The participants' ages ranged from 17 to 44. In total, 135 females and 32 males participated in study 2.

2.3.3 Participant Inclusion and Exclusion Criteria

- No inclusion and exclusion criteria set for both studies.

The researcher based this decision on the fact that she was selecting healthy participants from the general population (i.e. from non-clinical populations). As the majority of the

participants in both studies were selected from University populations, it was presumed that participants were fluent in reading English. It was also presumed that participants would not have a recognized learning disability and thus their ability to comprehend the questions being asked in the questionnaires would not be impaired.

2.4 Measures

2.4.1 Study 1

Participants in this group were invited to complete two self-report pencil and paper questionnaires on one occasion only: These were as follows;

- A Demographic Questionnaire
- CFQ (CFQ) (42 Items)

2.4.2 Study 2

Participants in this group were invited to complete six self-report pencil and paper questionnaires on one occasion only: These were as follows;

- A Demographic Questionnaire
- CFQ (CFQ) (28 Items)
- The Southampton Mindfulness Scale (SMQ) Chadwick, Hember, Symes, Peters, Kuipers and Dagnan, 2008).
- The Dieners Satisfactions with Life Scale (SWLS) (Diener, Emmons, Larsen and Griffin, 1985).
- The Acceptance and Action Questionnaire (AAQ-II) (Hayes, Strosahl, Wilson *et al.* (2004).

- The Thought Control Questionnaire (TCQ) (Wells and Davis, 1994)

Apart from the aforementioned CFQ these measures will now be discussed in more detail.

2.4.3 Demographic Questionnaire (See Appendix 3)

A specific demographic questionnaire was developed for this study. Participants were invited to complete the brief questionnaire which asked for information regarding gender and age.

2.4.4 The Southampton Mindfulness Questionnaire (SMQ) (Chadwick, Hember, Symes *et al*. 2008) (See Appendix 4)

The Southampton Mindfulness Questionnaire (SMQ) consists of 16 items rated on a 7-point scale (7 = Agree Totally, 1 = Disagree Totally). The SMQ assesses mindful responding to unpleasant thoughts and images. Chadwick *et al.* (2008) examined the reliability and validity of the SMQ in a community sample of meditators (n = 83) and non-meditators (n = 51). The authors reported good internal consistency for the SMQ (alpha = .89), a statistically significant correlation (r = .57) with the Mindful Attention Awareness Scale (MAAS: Brown and Ryan, 2003), statistically significant differences in the expected direction between meditators and nonmeditators (t = 3.40, df = 132, p = .001), statistically significant correlations with mood ratings, and sensitivity to increase in mindfulness over a Mindfulness Based Stress Reduction (MBSR: Kabat-Zinn, 1990) based training programme for 20 health professionals. The psychometric properties of the SMQ have been further assessed by Baer, Smith, Hopkins, Krietemeyer and Toney (2006). In their sample of 613 undergraduates, the

SMQ revealed good internal reliability (alpha = 0.85) and was statistically significantly positively correlated in all directions with all other mindfulness measures.

2.4.5 The Dieners Satisfactions with Life Scale (SWLS) (Diener, Emmons, Larsen and Griffin, 1985). (See Appendix 5)

The Satisfaction with Life Scale (SWLS) is a global measure of life satisfaction and consists of 5-items that are completed by the individual whose life satisfaction is being measured. Items in the SWLS are rated on a 7-point scale and include items such as "*In most ways my life is close to my ideal*" and "*If I could live my life over, I would change almost nothing*". The items are summed to yield a domain satisfaction composite score. Diener *et al.* (1985) indicate that scores between 30-35 indicate high satisfaction, scores between 25-29 indicate that the individual likes their life and feels that things are going well, scores between 20-24 indicate average life satisfaction, scores between 15-19 indicate slightly below average life satisfaction, scores between 10-14 state dissatisfaction and finally scores between 5-9 indicate extreme dissatisfaction. Diener *et al.* (1985) reported a two month test-retest correlation coefficient of .82 and an alpha coefficient of .87 for a sample of 176 undergraduates.

2.4.6 The Acceptance and Action Questionnaire (AAQ-II) (Hayes, Strosahl, Wilson *et al*. (2004). (See Appendix 6)

The AAQ-II is a 10-item inventory rated on a 7-point scale (1=never true, 7=always true) that assesses the construct of psychological flexibility. Items include "*It seems like most people are handling their lives better than I am*" and "*I worry about not being able to control my*

worries and feelings". High scores on the AAQ-II are reflective of greater experiential avoidance and difficulty in taking action when confronted by difficult private experiences such as thoughts, memories, feelings and urges, while low scores reflect greater acceptance and action. Across seven samples (five 'normal' samples of people and two samples of people seeking treatment for substance misuse) with a total of 3300 participants the AAQ-II was found to have an adequate structure and good reliability and validity (Hayes *et al.* 2004). The reliability of the AAQ-II across the seven samples had a mean alpha coefficient of .83 (ranging from .76 to .87) and a three and twelve month test-retest reliability of r = .80 and r = .78 respectively (Hayes *et al.* 2004). The AAQ-II has also been shown to have substantial incremental and criterion related validity (Hayes *et al.* 2004).

2.4.7 The Thought Control Questionnaire (TCQ) Wells and Davis, 1994). (See Appendix 7)

The Thought Control Questionnaire (TCQ) is designed to measure various techniques that individuals use to control unpleasant and unwanted thoughts. The questionnaire consists of 30 items rated on a 4-point scale (1 = Never, 4 = almost always). The TCQ is a five factor instrument that measures individual differences in strategies that people use to try and control unwanted distressing thoughts. These strategies include distraction, worry, punishment, social control, and reappraisal. Each factor has six items per strategy. The measure requires one to answer about the techniques they generally use to control unpleasant and/or unwanted thoughts on a four point rating scale ranging from "never" to "almost always". Sample items include "*I occupy myself with work instead*" (distraction), "*I ask my friends if they have similar thoughts*" (social control), "*I focus on different negative thoughts*" (worry), "*I punish myself for thinking the thought*" (punishment) and finally "*I question reasons for having the*

thought" (reappraisal). Internal consistency was found to be acceptable (a = .64 for punishment, a = .67 for reappraisal) to good (a = .72 for distraction, a = .79 for social control and a = .71 for worry) (Wells and Davis, 1994). Test-retest reliability (six weeks) ranged from, r = .67 for punishment to r = .83 for social control (Wells and Davis. 1994).

2.5 Ethical Approval

Ethical approval was granted by the North of Scotland Research Ethics Committee on 26th May 2008 (See Appendix 8). Approval was also given by the Grampian Research and Development Committee on 20th June 2008 (See Appendix 9). As my research required me to recruit Undergraduate students, I had to apply for ethical approval via the University of Edinburgh Psychology Department. I approached the Head of Department and outlined the aims of my study. I was required to complete an application in order to recruit the undergraduate students. After completing an ethics form and submitting the necessary documentation, I was granted Ethical approval on (23rd September 2008) (See Appendix 10). Ethical approval was also sought to recruit Postgraduate Clinical Psychology students via the School of Health and Social Science at Edinburgh University. This involved the researcher completing a further ethics form. After submitting the required documentation I was granted ethical approval on 3rd March 2008.

2.6 Ethical Considerations

While the above study did not require the informed consent of participants due to the study entailing the use of anonymous questionnaires where participants would not be personally

identifiable, the researcher was aware of other potential shortcomings and ethical considerations.

All participants were explicitly informed that participation was entirely voluntary. Participants sampled from the University population who did not wish to take part in the study were told that their decision to do so would have no bearing on their University course credits. Furthermore, to ensure that participants selected from the University sample did not feel in anyway coerced to participate in the study, a ballot box procedure was adopted in both studies.

It was not anticipated that the questionnaires used in this research would cause distress. However, if an individual did become unexpectedly distressed, participants were informed to cease completion of the questionnaires. The opportunity was offered to all participants to contact the primary researcher and/or her academic supervisor to discuss any difficulty they encountered or indeed to ask about any aspect of the study. Individuals were verbally told of this protocol and further information pertaining to this was provided on the Participant Information Sheet provided to all participants.

2.7 Procedure

The present research was conducted in two stages. Each stage will be referred to as “Study 1” and “Study 2”.

2.7.1 Study 1

The researcher attended undergraduate and postgraduate lectures. Participants were told by the researcher that the study was being conducted to develop a questionnaire measuring the constructs of cognitive fusion and cognitive defusion. They were also informed that their participation was completely voluntary, anonymous and confidential.

The questionnaire package contained an information sheet (See Appendix 11) that stated the purpose of the study and a statement indicating that a summary of the findings of the study would be available in February 2009 for interested participants; and they had the right to withdraw at any time. In addition, any individuals who became distressed as a result of completing the questionnaires were asked to contact the researcher. The information sheet and two questionnaires in paper format were distributed before and after the lecture. Participants were invited to complete the questionnaires and to put the questionnaires in a box that was left in the lecture theatre. The researcher collected the questionnaires at a later date. Implicit consent was given by those individuals who completed and returned the questionnaires.

The researcher also decided to use the internet site www.surveymonkey.com to create an online version of the questionnaires. The aim of this was twofold: to yield a higher response rate and to use less paper. The researcher paid a subscription fee of approximately £15.00 per month to advertise the questionnaires. This ensured that participants could complete the questionnaires in an environment of their choice thus choosing their own level of privacy.

Participants were given two months to respond. Implicit consent was given by those individuals who completed the online questionnaires.

2.7.2 Study 2

The researcher attended undergraduate lectures and postgraduate lectures. Participants were told by the researcher that the study being conducted was the second study in a two-part research project to develop a questionnaire to measure the constructs of cognitive fusion and cognitive defusion. The participants were informed that their participation was completely voluntary, anonymous and confidential.

The questionnaire package contained an information sheet (See Appendix 12) that stated the purpose of the study and a statement indicating that a summary of the findings of the study would be available in February 2009 for interested participants. The information sheet highlighted to all participants that they had the right to withdraw at anytime. In addition, any individuals who became distressed as a result of completing the questionnaires were asked to contact the researcher. Participants were presented with an information sheet outlining the nature of the study. Participants were asked to complete six questionnaires and to put the questionnaires in a box that was left in the lecture theatre. The researcher collected the questionnaires at a later date. Dr David Gillanders (Academic Supervisor) also advertised the study in two Trainee Clinical Psychology lectures at Edinburgh University. The same box procedure was also adopted in this situation. Implicit consent was given by those individuals who completed and returned the questionnaires.

2.8 Confidentiality

No identifying information was obtained from participants in Study 1 or Study 2.

2.9 Analytic Plan

Data were analysed using SPSS for Windows (Version 14.0). The methods of statistical analysis was Principal Component Analysis and correlational analysis. An outline of the statistical procedures and reasons for their selection are provided below.

2.9.1 Study 1

2.9.1.1 Factor Analysis (Principal Component Analysis)

Factor analysis is an analytical tool that determines empirically how many constructs or latent variables or factors underlie a set of items (De Vellies, 1991). Two commonly used methods for extracting factors are Principal Component Analysis and Principal Axis Factoring (Russell, 2002). Principal Component Analysis and Principal Axis Factoring essentially involve the same procedure for extracting factors from a correlation matrix. However, the fundamental difference between the two approaches is the variance that each variable shares with the other measured variables (Russell, 2002). In Principal Component Analysis, the prior communalities equal 1.0. In Principal Axis Factoring the communalities are estimates of the item reliability on the factor. A communality is defined as an estimate of the item reliability of a single variable on a latent variable. It represents the extent to which a particular variable is correlated with the total score of a factor. In this study, the items were subjected to Principal Component Analysis. Principal Component Analysis takes a set of

variables and defines a new set of variables (completely recapturing all of the variability among the original set of variables) (De Vellies. 1991). Stevens (1996) highlights a preference for Principal Component Analysis because it is psychometrically sound, and avoids some of the potential problems with 'factor indeterminacy' associated with factor analyses (Stevens, 1996, p. 363).

2.9.1.2 Data Screening

It was important to check if all the data were in place and accounted for, and to check the data for inaccuracies, absent or missing data. When considering this it was important to establish whether there was a pattern to any missing data. This may have indicated problems with the sample understanding or answering specific questions.

Frequency tables and histograms for each item were examined to identify items with extremely skewed response distributions. The histograms allowed for a visual approximation of the distribution shape and it was helpful to visually determine how close responses on each question were to a normal distribution. Within this process the researcher was also checking that each item was responded to with the full range of scores.

2.9.1.3 Suitability Phase for Principal Component Analysis

Principal Component Analysis is based on the correlation matrix of the variables involved, and correlations usually need a large sample size before they stabilize. Tabachnick and Fidell

(1996) state that the sample size must be greater than 150. This was ensured prior to analysis.

The data were checked for sufficient multicollinearity in the correlation matrix (i.e. the correlation matrix for the variables must contain two or more correlations of 0.30 or greater). This concern reflects the factorability of the correlation matrix (Tabachnick and Fiddell, 2001). Muticollinearity was examined through the use of Bartlett's test of sphericity. Bartlett's test of sphericity has to be statistically significant ($p < .05$) in order to proceed with factor analysis. Bartlett's test of sphericity tests the null hypothesis that the correlation matrix is an identity matrix. An identity matrix is a matrix in which all of the diagonal elements are 1 and all off diagonal elements are 0 (Nunnally and Bernstein, 1994).

The data were also checked to see whether the overall measure of sampling adequacy was 0.50 or higher. Sampling adequacy predicts if the data are likely to factor well, based on the correlations and partial correlations. The Kaiser-Meyer-Olkin (KMO; Kaiser, 1974) was adopted to establish whether the overall measure of sampling adequacy for the set of variables exceeded the minimum requirement of 0.50. The KMO statistic varies between 0 and 1. A value of 0 indicates that the sum of partial correlations indicates diffusion in the pattern of correlations. A value close to 1 indicates that patterns of correlations are relatively compact and so factor analysis should yield distinct and reliable factors. Kaiser (1974) recommends accepting values greater than 0.5 as "acceptable". Values between 0.8 and 0.9 are considered "great" and values above 0.9 are considered "superb". Principal Component Analysis requires the above requirements to be satisfied before proceeding with the analysis.

If the above requirements are not met, factor analysis is not appropriate. Froman (2001) argues that by meeting the above requirements, measurement of variables become more sound.

2.9.1.4 Criteria for Determining the Number of Factors

Once the factors have been extracted from the correlation matrix, the researcher has to determine how many factors to retain. Two criteria that are often used to determine the number of factors is Kaiser's criterion and the scree test attributed to Cattell (as cited in Russell, 2002). Thurstone (1974) recommends accepting eigenvalues in excess of 1. This is sometimes referred to as the Kaiser (1960) criterion (Russell, 2002). The eigenvalues refer to the amount of variance explained by a factor (Russell, 2002). They are computed by squaring the loadings on a factor and summing them. Another technique often used is the scree test (Cattell, 1966). In order to determine the number of factors on a scree test, one has to look for a break in the values. The number of factors prior to the drop represents the number of factors to be extracted. Fabrigar, Wegener, MacCallum and Strahan (as cited in Russell, 2002) indicate that examining the scree plot for breaks provides a reasonably accurate indication of the number of factors. Both techniques were explored when examining the data.

2.9.1.5 Rotation Methods

Rotation of the factors refers to the shifting of the factors in the factor space to maximize the interpretation of the factor loadings (Nunnally and Bernstein, 1994). Rotation can be classified into two types, orthogonal and oblique (Russell, 2002). Orthogonal rotation is

conducted in such a manner that the factors are uncorrelated with one another. This procedure assists in the interpretation of the factors. The form of orthogonal rotation most often used is termed varimax. The varimax procedure maximizes the interpretation of factors. A second type of rotation is oblique rotation. In oblique rotation the factors are allowed to correlate with one another (Russell, 2002). This procedure is most representative of the *true* relationship between the factors. In summary, oblique rotation allows the latent constructs to be correlated with each other whereas orthogonal rotation leads to latent constructs that have zero correlation between them.

Russell (2002) suggests that while orthogonal rotations simplify the presentation and interpretation of factor analysis results, they often do not lead to simple structures due to the underlying correlations between the factors. He recommends that investigators should conduct an oblique rotation. Furthermore, Netemeyer, Bearden, & Sharma (2003) suggest that an oblique rotation allows the factors to correlate and can provide more meaningful theoretical factors. For the purposes of this research, the oblique rotation procedure was used. Fabrigar *et al*. (1999) recommends that investigators use procedures such as Promax when conducting an oblique rotation.

2.9.1.6 Item Analysis

Factor analysis is a technique for data reduction. The principle aim is to find out which, among the items that the investigator is testing, need to be kept and those which should not be kept (Nunnally and Bernstein, 1994). The researcher reviewed the factor loadings for each item. The factor loadings indicate how much each item belongs to each of the underlying

factors. The researcher selected those items that loaded highly on the factor or factors (i.e. the underlying concept or concepts). More specifically, items with factor loadings smaller than 0.4 were removed from the analysis. Cross factor loadings were also removed to ensure that each item loaded onto only one factor. Several iterations of Principal Component Analysis were conducted in order to reach a satisfactory factor solution. The researcher attached a descriptive name for each of the factors once they were extracted and identified.

2.9.1.7 Reliability Analysis

Nunnally and Berstein (1994) suggest that exploratory factor analytic results tend to capitalize on chance aspects of the item associations. They suggest that an important step is to conduct reliability analyses once potential scales are identified. The reliability statistics provide another form of evidence of how well the items within a scale define a construct. Cronbach's coefficient alpha provides an estimate of the internal consistency of the entire scale. This estimate of internal consistency is mathematically equivalent to an estimate of a hypothetical correlation that would result if a parallel form of the scale were created and the correlation between the alternate form and the original form were calculated (Hatcher, 1994). The higher the score, the more reliable the generated scale is. Nunnally (1978) has indicated 0.7 to be an acceptable reliability coefficient. De Vellis (2003) has delineated the following ranges: below .60 is unacceptable, .60 to .65 is undesirable, .65 to .70 is minimally acceptable, .70 to .80 is respectable, .80 to .90 is very good, and the scale should be shortened if the alpha is above .90. Internal consistencies of the total scale and the subscales, as measured by Cronbach's alpha, were analysed. Items that contributed negatively to the scales alpha were removed.

2.10 Study 2

2.10.1.1 Factor Analysis (Principal Component Analysis)

Principal Component Analysis was used in study 2 to further establish the structural validity of the scale. The procedure outlined in study 1 above was used.

2.10.1.2 Correlational Analysis

A Pearson Correlation Co-efficient was conducted to examine whether there was an association between participants' scores on the different questionnaires and the full score of the finalized CFQ.

3 CHAPTER THREE: RESULTS

3.1 Study 1 Factor Analysis (Principal Component Analysis)

3.1.1 Sample Characteristics

The sample comprised 425 participants: 142 were male (33.4%) and 283 were female (66.6%). Of the respondents 253 (59.5%) were aged between 17-24, 140 (32.9%) were aged between 25-34, 12 (3.5%) were aged between 35-44, 8 (1.9%) were aged between 45-55 and 9 (2.1%) were over 55.

3.1.2 Data Screening

Frequency distributions indicated that three items had a skewed (non-symmetric) distribution. Item 8 "*I feel like my thoughts need to change before I can have a good life*" indicated a negative skew. Item 40 "*There is more to me than my* thoughts" and item 42 "*It's possible for me to have negative thoughts about myself and still know that I am an OK person*" indicated a positive skew. However on further examination the items were only marginally skewed and all three items had the full range of responses. After considering this and the possibility that retaining the three items could affect the factor analysis, the researcher reached the decision to retain all three items based on the hypothesis that the sample of participants examined was healthier than those found in the general population.

3.1.3 Factorability of Correlation Matrix

The sample size was considered large enough for the analyses (Gorsuch, as cited in MacCallum *et al.* 1999; Guilford, as cited in MacCallum *et al.* 1999; Cattle, as cited in MacCallum *et al.* 1999). Kaiser-Meyer-Olkin (KMO) measures of sampling adequacy and Bartlett's tests of sphericity were evaluated for the factorability of the correlation matrix (i.e., to determine whether the items could be classified into a few categories) (Stevens, 2002). The factorability of the correlation matrix comprising 42 items was found to be adequate according to several indicators. The KMO measure of sampling adequacy was .91, which indicated a “meritorious” degree of non-unique covariance amongst the set of items (Kaiser, 1974). A significant Bartlett's test of sphericity indicated that the correlation matrix was significantly different ($p<0.001$). This suggests that the correlations were not found to constitute an identity matrix. Threats to multicollinearity and singularity were also checked and excluded. Taken together, these tests provide a minimum standard which should be passed before a Principal Components Factor Analysis should be conducted. All 42 items were retained for analysis.

3.1.4 Factor Extraction

Ten components attained eigenvalues >1.0 (10.9, 3.10, 2.35, 1.64, 1.47, 1.30, 1.22, 1.18, 1.07, 1.02). Table 3.1 depicts the ten factors that have eigenvalues >1.0.

Table 3.1: Eigenvalues and Percentage of Variance of Components

Component		Initial Eigenvalues	
	Total	% of Variance	Cumulative %
1	10.949	26.068	26.068
2	3.104	7.390	33.458
3	2.353	5.603	39.062
4	1.644	3.913	42.975
5	1.475	3.511	46.486
6	1.301	3.098	49.585
7	1.225	2.918	52.502
8	1.184	2.818	55.320
9	1.075	2.559	57.879
10	1.023	2.435	60.314
11	.975	2.322	62.636
12	.932	2.218	64.854
13	.895	2.132	66.986
14	.836	1.991	68.977
15	.781	1.859	70.836
16	.756	1.799	72.635
17	.713	1.698	74.333
18	.672	1.600	75.932
19	.638	1.518	77.451
20	.627	1.494	78.944
21	.611	1.455	80.400
22	.591	1.407	81.807

23	.577	1.374	83.181
24	.547	1.303	84.484
25	.542	1.290	85.774
26	.473	1.127	86.901
27	.466	1.109	88.011
28	.452	1.077	89.088
29	.426	1.014	90.102
30	.419	.996	91.099
31	.404	.961	92.060
32	.385	.916	92.976
33	.377	.898	93.874
34	.356	.848	94.722
35	.335	.799	95.521
36	.322	.766	96.287
37	.301	.716	97.003
38	.276	.658	97.660
39	.273	.649	98.309
40	.254	.604	98.913
41	.240	.573	99.486
42	.216	.514	100.000

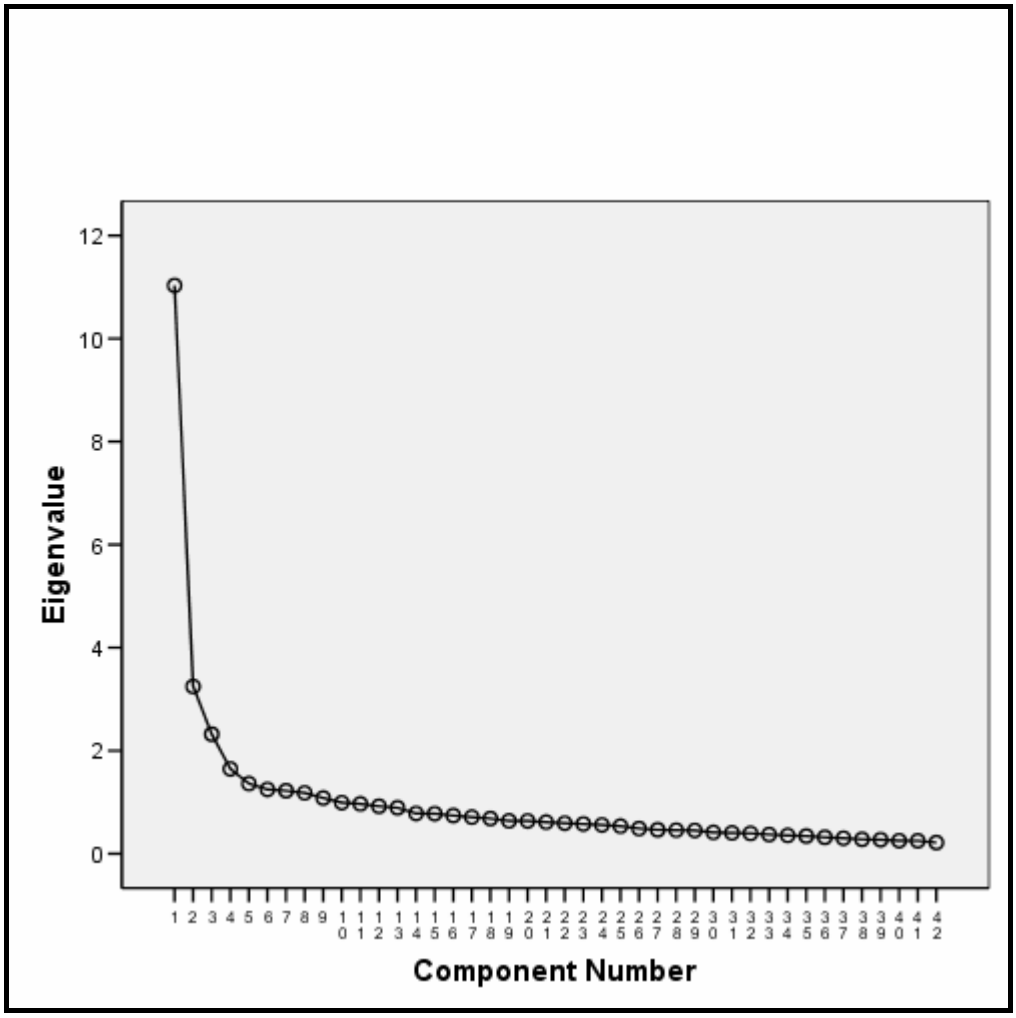

Figure 3.1: Scree Plot

By Kaiser's (1974) criterion we should extract ten factors. However, De Vellis (1991) recommends that a scree plot should be used when the sample size is above three hundred or more cases. The graphical scree plot proposed by Cattell (1966) was therefore used to reduce the number of components from the items in the instrument. The scree plot indicates the presence of two clear components. However, it also indicates the possibility of there being a third component and a fourth component. Before the final decision concerning the number of components was reached, the researcher reviewed the pattern matrix with promax rotation. In order to establish the number of components to retain, the researcher and her Academic

Supervisor reviewed the items that loaded onto the four components. Items based on factor loadings of > .3 on one factor and < .3 on the other factor were reviewed. Component three revealed that three items met this criterion. Reliability analysis using Cronbach's coefficient alpha indicated .15 for the three items. The decision was reached to exclude this as a component as the component did not yield a high reliability for the three items. In terms of component four, four items met the criterion as set above. Reliability analysis using Cronbach's coefficient alpha indicated .58 for the four items. However, component four was not interpretable because both fusion and defusion items loaded onto it and not in theoretically consistent ways. Therefore, the decision was reached to retain only two components.

3.1.5 Item Reduction

Several iterations of a restricted two factor solution of Principal Component Analysis with oblique rotation (promax) was conducted.

Items based on factor loadings of > .3 on one factor and < .3 on the other factor were retained. Thirty-one items met this criteria. The items are outlined below.

1. "*My thoughts cause me distress or emotional pain*"
2. "*I tell myself that I shouldn't be thinking the way I'm thinking*"
3. "*Even when I am having distressing thoughts, I know that they may become less important eventually*"
4. "*I find myself preoccupied with the future or the past*"

5. "*I make judgements about whether my thoughts are good or bad*"

6. "*Even when I'm having upsetting thoughts, I can see that those thoughts may not be literally true*"

7. "*I get upset with myself for having certain thoughts*"

8. "*I feel like my thoughts need to change before I can have a good life*"

9. "*I find it easy to view my thoughts from a different perspective*"

10. "*I tend to get very entangled in my thoughts*"

11. "*I think some of my thoughts are bad or inappropriate*"

12. "*I do not over-analyse my thoughts*"

14. "*It's such a struggle to let go of upsetting thoughts even when I know that letting go would be helpful*"

16. "*I get so caught up in my thoughts that I am unable to do the things that I most want to do*"

17. "*I over-analyse situations to the point where it's unhelpful to me*"

18. "*I can watch my thoughts from a distance without getting caught up in them*"

19. "*There are certain areas in my life where my thoughts are rigid or inflexible*"

20. "*I get so caught up in my thoughts that I don't see other people's point of view*"

21. "*I am able to do what's important in my life even when I have upsetting thoughts*"

22. "*I struggle with my thoughts*"

24. "*I can be aware of my thoughts without necessarily reacting to them*"

28. "*I get so caught up in my thoughts that I forget what I'm actually doing*"

29. "*I tend to react very strongly to my thoughts*"

33. "*My mind is capable of having upsetting thoughts, but I can live with them"*

34. "*I need to control the thoughts that come into my head*"

35. "*Once I've thought about something upsetting its difficult for me to focus on anything else*"

37. "*I brood over past events*"

38. "*I can do difficult things even if my thoughts say they are impossible to do*"

40. "*There is more to me than my thoughts*"

41. "*I worry a great deal*"

42. "*It's possible for me to have negative thoughts about myself and still know that I am an OK person*"

Principal Component Analysis using oblique rotation (promax) was performed on the remaining 31 items. Reliability analysis using Cronbach's coefficient alpha indicated an internal consistency of .79. The decision was reached to remove items that would yield a higher Cronbach's alpha than .79. Four items met this criteria and they are outlined below.

12. "*I do not over-analyse my thoughts*"

18. "*I can watch my thoughts from a distance without getting caught up in them*"

40. "*There is more to me than my thoughts*"

41. "*I worry a great deal*"

Item 12 and item 40 were deleted for this reason. The researcher decided to retain item 18 and item 41 as both items represented an important aspect of defusion.

Principal Component Analysis with oblique rotation (promax) was repeated for the remaining 29 items. In order to clarify the two factors further items based on loadings of > .4 on one factor and < .4 on the other factor were retained. Twenty-two items met this criteria. This included the following items:

1. "*My thoughts cause me distress or emotional pain*"

2. "*I tell myself that I shouldn't be thinking the way I'm thinking*"

3. "*Even when I am having distressing thoughts, I know that they may become less important eventually*"

4. "*I find myself preoccupied with the future or the past*"

5. "*I make judgements about whether my thoughts are good or bad*"

6. "*Even when I'm having upsetting thoughts, I can see that those thoughts may not be literally true*"

7. "*I get upset with myself for having certain thoughts*"

8. "*I feel like my thoughts need to change before I can have a good life*"

9. "*I find it easy to view my thoughts from a different perspective*"

10. "*I tend to get very entangled in my thoughts*"

11. "*I think some of my thoughts are bad or inappropriate*"

14. "*It's such a struggle to let go of upsetting thoughts even when I know that letting go would be helpful*"

16. "*I get so caught up in my thoughts that I am unable to do the things that I most want to do*"

17. "*I over-analyse situations to the point where it's unhelpful to me*"

18. "*I can watch my thoughts from a distance without getting caught up in them*"

21. "*I am able to do what's important in my life even when I have upsetting thoughts*"

22. "*I struggle with my thoughts*"

24. "*I can be aware of my thoughts without necessarily reacting to them*"

28. "*I get so caught up in my thoughts that I forget what I'm actually doing*"

29. "*I tend to react very strongly to my thoughts*"

34. "*I need to control the thoughts that come into my head*"

35. "*Once I've thought about something upsetting its difficult for me to focus on anything else*"

The researcher decided to retain item 38 "*I can do difficult things even if my thoughts say they are impossible to do*" and item 42 "*It's possible for me to have negative thoughts about myself and still know that I am an OK person*" as these items were theoretically related to the construct of defusion.

Principal Component Analysis using oblique rotation (promax) was conducted on the remaining 24 items, restricting the factor analysis to a two-factor solution. The KMO (Kaiser, 1974) measure of sampling adequacy was repeated with the 24-item version, which indicated .91. The Bartlett test of sphericity was also repeated. This yielded a highly significant result ($p<0.001$).

The solution consisted of two components (24 items, m = 91.3, sd = 13.9), accounting for 44% of the variance in that set of items. Based on item content, the components were labelled *fusion* (16 items, m = 54.8, sd = 14.8) and *defusion* (8 items, m = 36.5, sd = 6.5). These components accounted for 32.6% and 11.4% of the variance respectively. Data for all items are presented in Table 3.2.

Table 3.2: Descriptive Data and Factor Loadings for the 24 items in the CFQ

Item Number	Component	
	1	2
1 My thoughts cause me distress or emotional pain	**.702**	.109
2 I tell myself that I shouldn't be thinking the way I'm thinking	**.681**	.259
3 Even when I am having distressing thoughts, I know that they may become less important eventually	-.194	**.628**
4 I find myself preoccupied with the future or the past	**.619**	.116
5 I make judgements about whether my thoughts are good or bad	**.537**	.345
6 Even when I'm having upsetting thoughts, I can see that those thoughts may not literally be true	-.153	**.748**
7 I get upset with myself for having certain thoughts	**.708**	.290
8 I feel like my thoughts need to change before I can have a good life	**.758**	.103
9 I find it easy to view my thoughts from a different perspective	.026	**.478**
10 I tend to get very entangled in my thoughts	**.689**	.022
11 I think some of my thoughts are bad or inappropriate	**.596**	.289
14 It's such a struggle to let go of upsetting thoughts even when I know that letting go would be helpful	**.678**	-.063
16 I get so caught up in my thoughts that I am unable to do the things that I most want to do	**.745**	.050
17 I over-analyse situations to the point where it's unhelpful to me	**.726**	-.025
18 I can watch my thoughts from a distance without getting caught up in them	-.447	**.399**

21 I am able to do what's important in my life even when I have upsetting thoughts	-.357	**.511**
22 I struggle with my thoughts	**.771**	.065
24 I can be aware of my thoughts without necessarily reacting to them	-.437	**.444**
28 I get so caught up in my thoughts that I forget what I'm actually doing	**.563**	.127
29 I tend to react very strongly to my thoughts	**.567**	-.007
34 I need to control the thoughts that come into my head	**.549**	.071
35 Once I have thought about something upsetting its difficult for me to focus on anything else	**.648**	-.183
38 I can do difficult things even if my thoughts say they are impossible to do	-.179	**.428**
42 Its possible for me to have negative thoughts about myself and still know that I am an ok person	-.359	**.386**

3.1.6 Reliability analysis

Internal consistencies, as measured by Cronbach's alpha, were .92 (fusion), .76 (defusion), and .81 (total scale). The correlation between the components as derived from the Principal Component Analysis indicated that there was a weak relationship between the components (r = -.253).

3.1.7 Gender Differences

An independent samples *t*-test was conducted to test for a gender difference between the two components. Prior to conducting an independent samples *t*-test the distributions of the two

components were reviewed. The fusion component depicted in Figure 3.2 indicated a normal distribution.

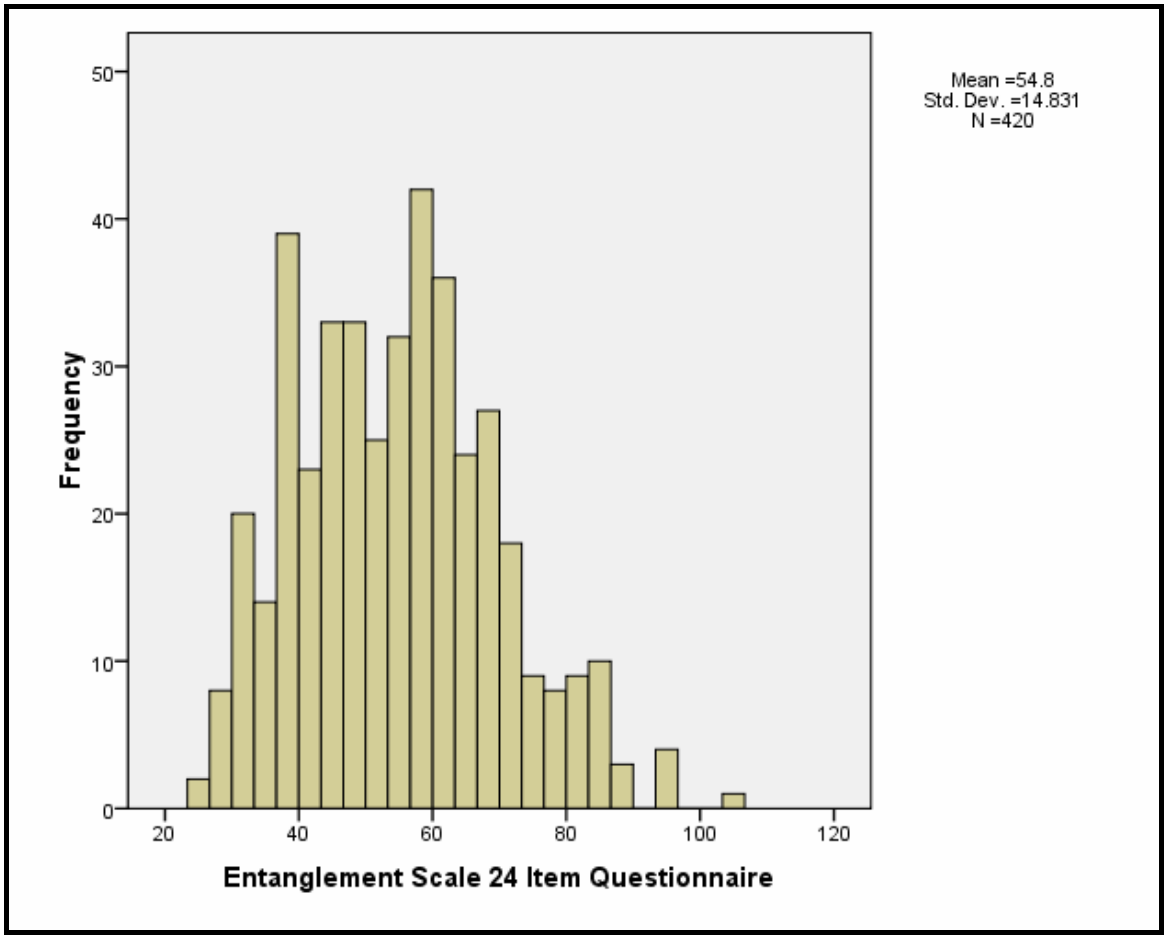

Figure 3.2: Fusion Component Frequency Distributions

However, this was not significant at the 5% level, t (418) = -1.027, P = .305, d = 0.1.

The defusion component depicted in figure 3.3 also revealed a normal distribution.

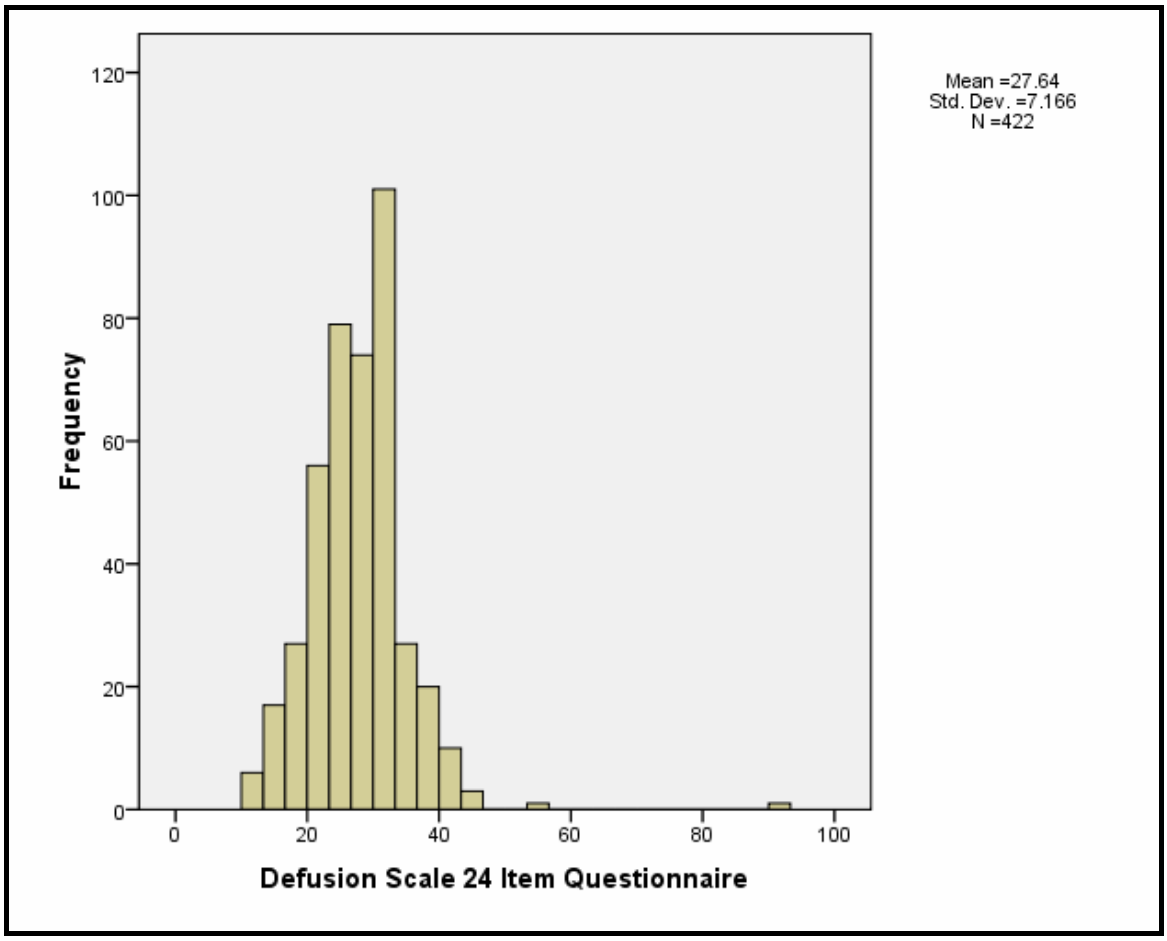

Figure 3.3: Defusion Component Frequency Distributions

However, this was also not significant at the 5% level, t (420) = .823, P = .760, d = 0.07.

3.1.8 Study 1 Summary of Findings

- The results of study 1 provide initial support for the CFQ. The items were chosen based on the judgement that the items were relevant to Hayes *et al's.* (1999) notion of cognitive fusion and cognitive defusion. Repeated Principal Component Analysis resulted in a two factor solution as the most appropriate grouping of the items. The remaining items were conceptually and theoretically congruent with the constructs of cognitive fusion and cognitive defusion as proposed by Hayes *et al.* (1999).

3.2 Study 2

3.2.1 Additional Questions

A similar study to the researcher's study was being conducted elsewhere in the UK. Through collaboratively working with the other researchers, the Principal Researcher and her Academic Supervisor included four questions that had performed well in Dr. Frank Bond's and Dr. Helen Bolderston's scale to the current scale being developed in this research to fully capture the theoretical constructs of cognitive fusion and cognitive defusion. Three questions pertained to the construct of cognitive fusion and one question related to the construct of cognitive defusion.

The four questions added to the scale are outlined below.

1. "*I feel upset when I have negative thoughts about myself*"
2. "*I get very focussed on distressing thoughts*"
3. "*My thoughts distract me from what I'm actually doing*"
4. "*Its OK to have inconsistent thoughts on the same subject*"

The final questionnaire in study 1 therefore consisted of 28 items (See Appendix 13). Of the 28 items, 19 items contained cognitive fusion items (fusion) and 9 items contained cognitive defusion items (defusion).

Once the structural validity of the scale had been explored, the next area of focus in the validation of the scale was the external validity component. The purpose of study 2 was to establish the external validity of the CFQ by subjecting it to a series of validity analyses, including correlations with criteria measures.

Participant's ratings on the 28 item CFQ were subjected to Principal Component Analysis using oblique rotation (promax) to determine whether the two-factor solution could be replicated with another sample of participants.

3.2.2 Sample Characteristics

The sample comprised 167 participants. 135 were female (80.8%) and 32 were male (19.2%). Of the respondents 128 (76.6%) were aged between 17-24, 33 (19.8%) were aged between 25-34 and 6 (3.6%) were aged between 35-44.

3.2.3 Data Screening

Frequency distributions showed one item with an extremely skewed response distribution. Item 22 "*I struggle with my thoughts*" was removed for this reason.

3.2.4 Factorability of Correlation Matrix

The sample size was considered large enough for the analyses (Gorsuch, as cited in MacCallum *et al.* 1999; Guilford, as cited in MacCallum *et al.* 1999; Cattle, as cited in MacCallum *et al.* 1999). The KMO (Kaiser, 1974) measure of sampling adequacy (.88)

indicated satisfactory factorability of the correlation matrix. Similarly, Bartlett's tests of sphericity (p<0.001) indicated that the correlation matrix was significantly different. A Principal Component Analysis using oblique rotation (promax) was performed on 27 items.

3.2.5 Factor Extraction

Six components attained eigenvalues >1.0 (8.52, 3.07, 1.68, 1.25, 1.16, 1.07). Table 3.4 depicts the six factors that have eigenvalues >1.0.

Table 3.4: Eigenvalues and Percentage of Variance of Components

Component		Initial Eigenvalues	
	Total	% of Variance	Cumulative %
1	**8.521**	31.557	31.557
2	**3.075**	11.388	42.946
3	**1.687**	6.249	49.195
4	**1.256**	4.652	53.847
5	**1.116**	4.132	57.979
6	**1.079**	3.997	61.975
7	.939	3.477	65.452
8	.910	3.372	68.824
9	.787	2.915	71.739
10	.751	2.783	74.522
11	.692	2.564	77.086
12	.616	2.282	79.367
13	.552	2.043	81.410
14	.550	2.036	83.447
15	.504	1.865	85.312
16	.484	1.794	87.105
17	.446	1.650	88.756
18	.435	1.610	90.366
19	.385	1.428	91.793
20	.378	1.398	93.191

21	.339	1.257	94.449
22	.330	1.224	95.672
23	.287	1.064	96.736
24	.277	1.027	97.764
25	.237	.877	98.641
26	.194	.718	99.359
27	.173	.641	100.000

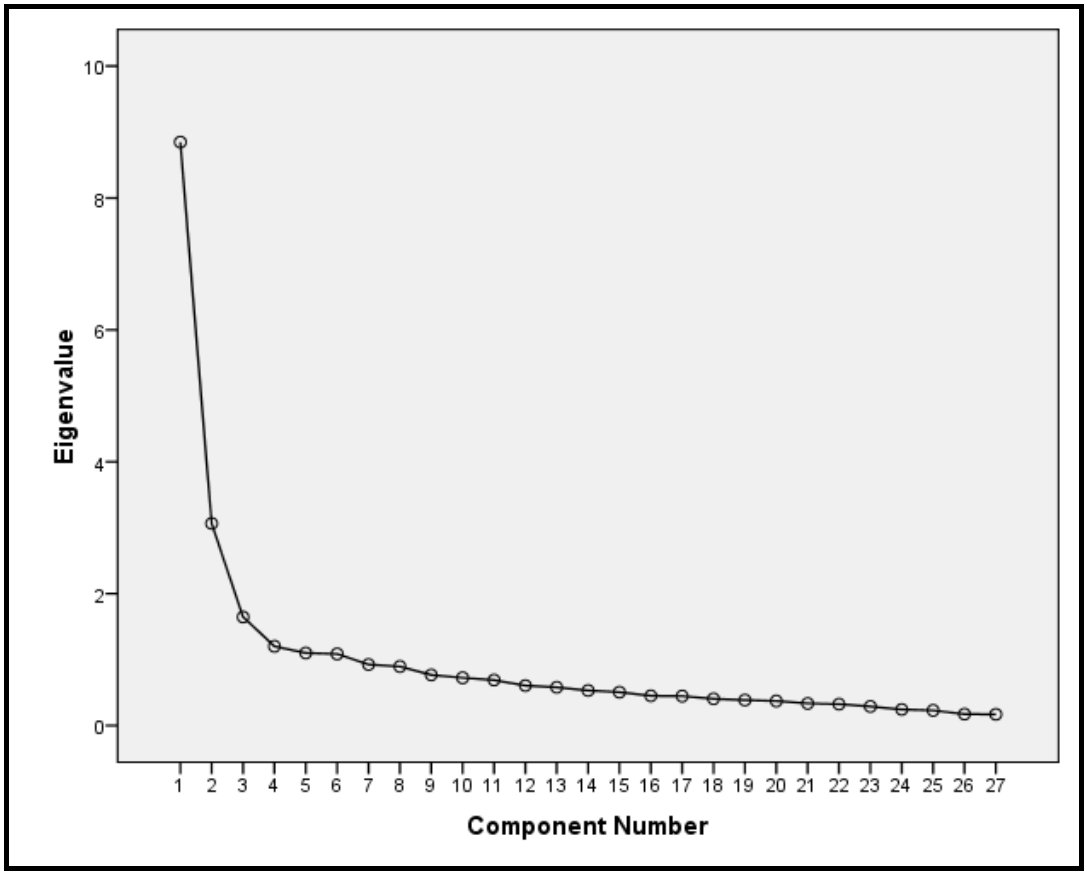

Figure 3.4: Scree Plot

The scree plot depicted in Figure 3.4 clearly indicates the presence of two clear factors. However, it also indicates the possibility of there being a third component. In order to establish the number of components to retain, the researcher and her academic supervisor reviewed the items that loaded onto the three components. Items based on factor loadings of > .3 on one factor and < .3 on the other factor were reviewed. Component three revealed that five items met this criterion. However, after considerable time reviewing the three components and the items within each component the decision was reached to exclude component three. As in Study 1, the third component could not be interpreted and the researcher and her Academic Supervisor decided that retaining only two components was in

line with the theoretical literature on ACT. Therefore, the decision was reached to retain only two components.

3.2.6 Item Reduction

Several iterations of a restricted two factor solution of Principal Component Analysis with oblique rotation (promax) were conducted.

Items based on factor loadings of >.6 on one factor and <.4 on the other factor were retained. The researcher was aware that the factor loadings on the defusion component were not as high as those factors on the fusion component. Cognitive defusion represents an important construct in ACT. Both the researcher and her Academic Supervisor decided that in spite of the low factor loadings, those questions pertaining to defusion should be kept. To ensure this, the decision was reached to lower the factor loading criteria on one component to allow for the retention of defusion items. Sixteen items met this criteria. These items are outlined below.

1. "*My thoughts cause me distress or emotional pain*".
2. "*I tell myself that I shouldn't be thinking the way I'm thinking*".
3. "*Even when I am having distressing thoughts, I know that they may become less important eventually*".
7. "*I get upset with myself for having certain thoughts*".
8. "*I feel like my thoughts need to change before I can have a good life*".
9. "*I find it easy to view my thoughts from a different perspective*".

10. "*I tend to get very entangled in my thoughts*".

13. "*I get very focused on distressing thoughts*".

14. "*It's such a struggle to let go of upsetting thoughts even when I know that letting go would be helpful*".

15. "*My thoughts distract me from what I'm actually doing*".

17. "*I over-analyse situations to the point where it's unhelpful to me*".

19. "*It is OK to have inconsistent thoughts on the same subject*".

20. "*It's possible for me to have negative thoughts about myself and still know that I am an OK person*".

25. "*Once I've thought about something upsetting it's difficult for me to focus on anything else*".

26. "*I need to control the thoughts that come into my head*".

27. "*I tend to react very strongly to my thoughts*".

Principal Component Analysis using oblique rotation (promax) was repeated for the remaining 16 items. In order to reduce the number of items further, items based on loadings of > .65 on one factor and < .4 on the other factor were retained. Again, due to the importance of cognitive defusion, the researcher and her Academic Supervisor decided to lower the factor loading criteria on one component to allow for the retention of defusion questions. Fourteen items met this criteria. This included the following items.

1. "*My thoughts cause me distress or emotional pain*".

2. "*I tell myself that I shouldn't be thinking the way I'm thinking*".

3. "*Even when I am having distressing thoughts, I know that they may become less important eventually*".

7. "*I get upset with myself for having certain thoughts*".

8. "*I feel like my thoughts need to change before I can have a good life*".

10. "*I tend to get very entangled in my thoughts*".

13. "*I get very focussed on distressing thoughts*".

14. "*It's such a struggle to let go of upsetting thoughts even when I know that letting go would be helpful*".

17. "*I over-analyse situations to the point where it's unhelpful to me*".

19. "*It is OK to have inconsistent thoughts on the same subject*".

20. "*It's possible for me to have negative thoughts about myself and still know that I am an OK person*".

25. "*Once I've thought about something upsetting it's difficult for me to focus on anything else*".

26. "*I need to control the thoughts that come into my head*".

27. "*I tend to react very strongly to my thoughts*".

The Researcher decided to retain item 9 "*I find it easy to view my thoughts from a different perspective*" as this item represented an important aspect of defusion.

Principal Component Analysis using oblique rotation (promax) was performed on the final 15 items. The researcher decided to extract two components. The KMO (Kaiser, 1974) measure of sampling adequacy was repeated with the 15-item version, which indicated .89. The Bartlett's test of sphericity was also repeated. This indicated a highly significant result ($p<0.001$).

The final solution consisted of two components (15 items, *m* = 52.1, *sd* = 12.6), accounting for 54% of the variance in that set of items. Based on item content, the components were labelled *fusion* (11 items, *m* = 39.4, *sd* = 11.3) and *defusion* (4 items, *m* = 12.4, *sd* = 3.76). These components accounted for 40% and 14% of the variance respectively. Data for all items are presented in Table 3.5. Appendix 14 provides an outline of the final scale.

Table 3.5: Descriptive Data and Factor Loadings for the 15 items in the CFQ

Item Number	Component	
	1	2
1 My thoughts cause me distress or emotional pain	**.727**	.198
2 I tell myself that I shouldn't be thinking the way I'm thinking	**.670**	.004
3 Even when I am having distressing thoughts, I know that they may become less important eventually	-.110	**.650**
7 I get upset with myself for having certain thoughts	**.713**	.033
8 I feel like my thoughts need to change before I can have a good life	**.768**	-.006
9 I find it easy to view my thoughts from a different perspective	-.368	**.648**
10 I tend to get very entangled in my thoughts	**.683**	.046
13 I get very focused on distressing thoughts	**.822**	.164
14 It's such a struggle to let go of upsetting thoughts even when I know that letting go would be helpful	**.810**	.054
17 I over-analyse situations to the point where it's unhelpful to me	**.718**	.212
19 It is OK to have inconsistent thoughts on the same subject	-.126	**.747**
20 Its possible for me to have negative thoughts about myself and still know that I am an OK person	-.202	**.743**
25 Once I've thought about something upsetting its difficult for me to focus on anything else	**.653**	.010
26 I need to control the thoughts that come into my head	**.688**	-.060
27 I tend to react very strongly to my thoughts	**.686**	.085

3.2.7 Reliability Analysis

Internal consistencies, as measured by Cronbach's alpha, were .91 (fusion), .71 (defusion), and .88 (total scale). The correlation between the components as derived from the Principal Component Analysis indicated that there was a weak relationship between the components (r = -.170).

3.2.8 Scoring Criteria for the Cognitive Fusion Questionnaire

The 15 items of the CFQ are divided into two domains: cognitive fusion and cognitive defusion. A 7-point Likert scale is used to evaluate the answers; a higher score indicates cognitive fusion and a lower score indicates cognitive defusion. The total subscale score on the fusion component is 77. Items 3, 7, 11 and 15 from the final scale (see Appendix 14) are reversed when calculating the total subscale score on the defusion component. The total subscale score on the defusion component is 28. The total score is the sum of the two components.

3.2.9 Gender Differences

An independent samples *t*-test was conducted to test for gender differences in participant responses to the CFQ. However, this was not significant at the 5% level, t (165) = .515, P =.295, d = 0.10.

An independent samples *t*-test was conducted to test for a gender difference between the two components. Prior to conducting an independent samples *t*-test the distributions of the two

components were reviewed. The fusion component depicted in figure 3.5 indicated a normal distribution.

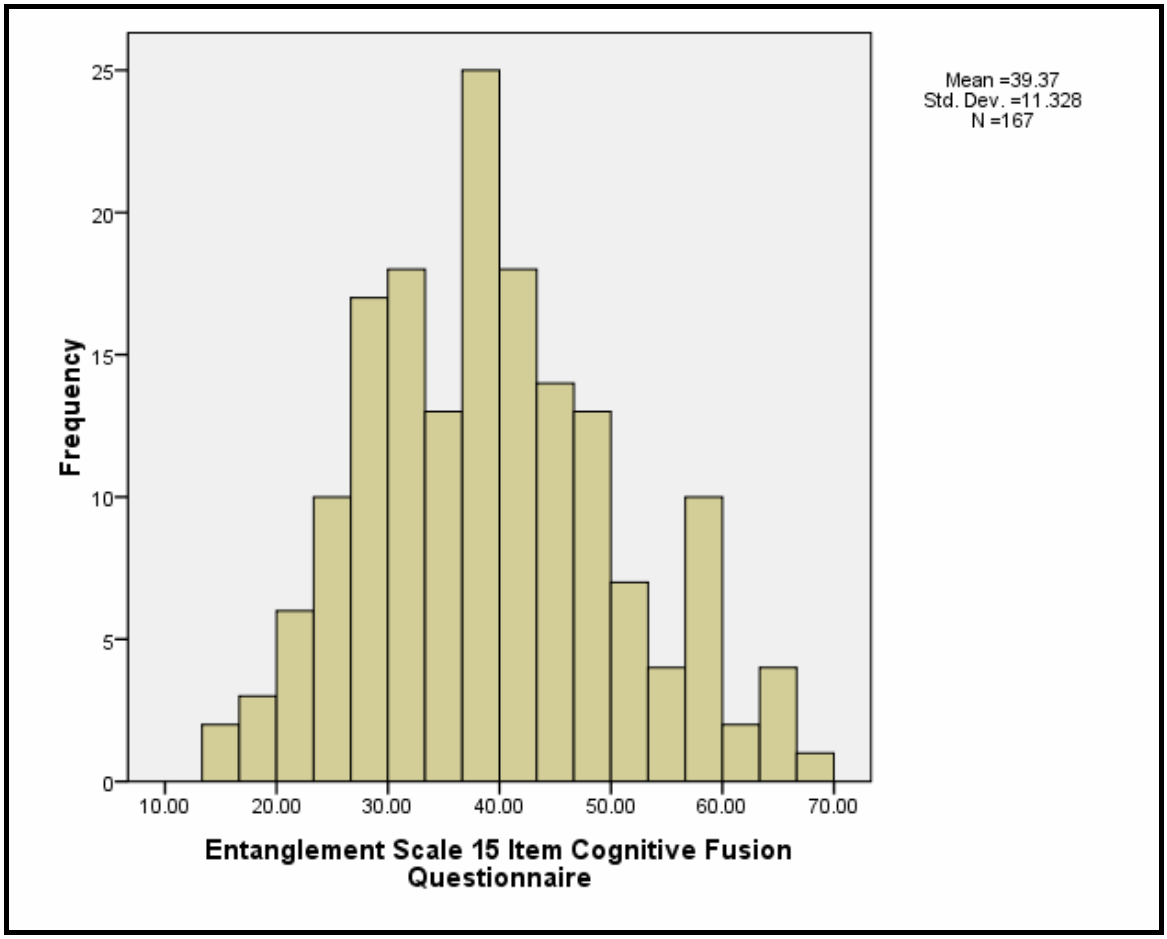

Figure 3.5: Fusion Component Frequency Distributions

However, this was not significant at the 5% level, t (165) = .240, P = .810, d = 0.05.

The defusion component depicted in figure 3.6 also revealed a normal distribution.

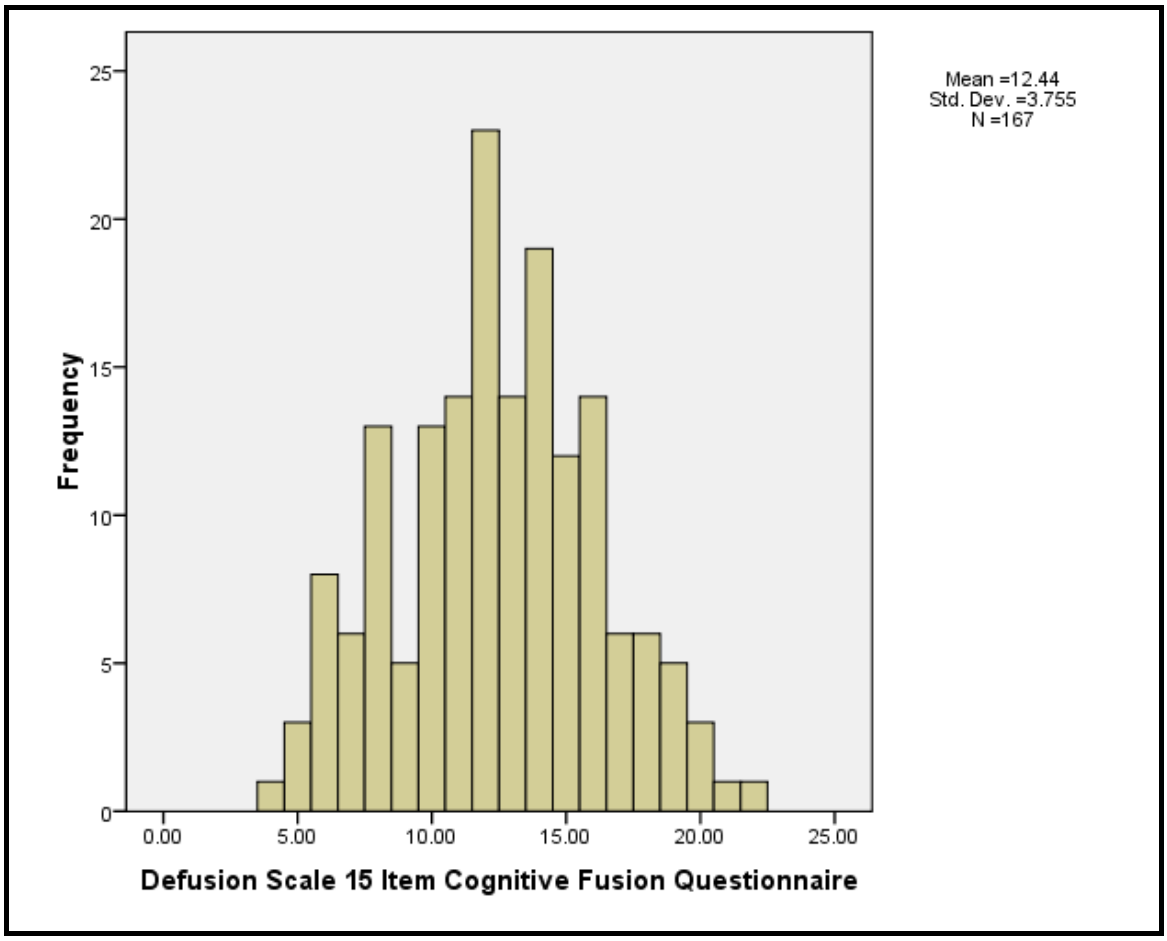

Figure 3.6: Defusion Component Frequency Distributions

However, this was also not significant at the 5% level t (165) = -.255, P = .317, d = 0.2.

Data Analysis (Correlation Analysis)

Data analysis was conducted on a computerised statistical package (SPSS 16) using Pearson correlation coefficient tests. All tests were conducted as one tailed tests. One-tailed tests should be used when there is a specific direction to the hypotheses being tested (Nunnally and Bernstein, 1994). An alpha level of .05 was used. Table 3.6 outlines the correlations for the CFQ, the Dieners Satisfactions with Life Scale, the Acceptance and Action Questionnaire, the Thought Control Questionnaire and the Southampton Mindfulness Scale.

Table 3.6: Pearson Correlations for the CFQ, the Dieners Satisfactions with Life Scale, the Acceptance and Action Questionnaire, the Thought Control Questionnaire and the Southampton Mindfulness Questionnaire.

	Dieners Satisfaction with Life Scale Total Score	The Acceptance and Action Questionnaire Total Score	Thought Control Questionnaire Total Score	Southampton Mindfulness Questionnaire Total Score
15 Item Cognitive Fusion Questionnaire Total Score	**-.427****	**.651****	**.172***	**-.792****

**. Correlation is significant at the 0.01 level (1-tailed)

*. Correlation is significant at the 0.05 level (1-tailed)

Each hypothesis will now be discussed in turn.

3.2.10 Test of Hypothesis One – Convergent Validity

It was expected that those participants that are more fused would have lower levels of life satisfaction compared to participants who have low levels of cognitive fusion.

Satisfaction with life was measured using the Dieners Satisfactions with Life Scale (Diener, Emmons, Larsen and Griffin, 1985).

Table 3.6 indicates a significant negative correlation between the CFQ and the Deiner's Satisfaction with Life Scale (Diener *et al.* 1985) ($r = -.427$; $n = 167$; $p<0.01$); thus participants with higher levels of cognitive fusion have lower levels of life satisfaction. Therefore the hypothesis was supported. The scatter plot in figure 3.7 shows the correlation between the two variables.

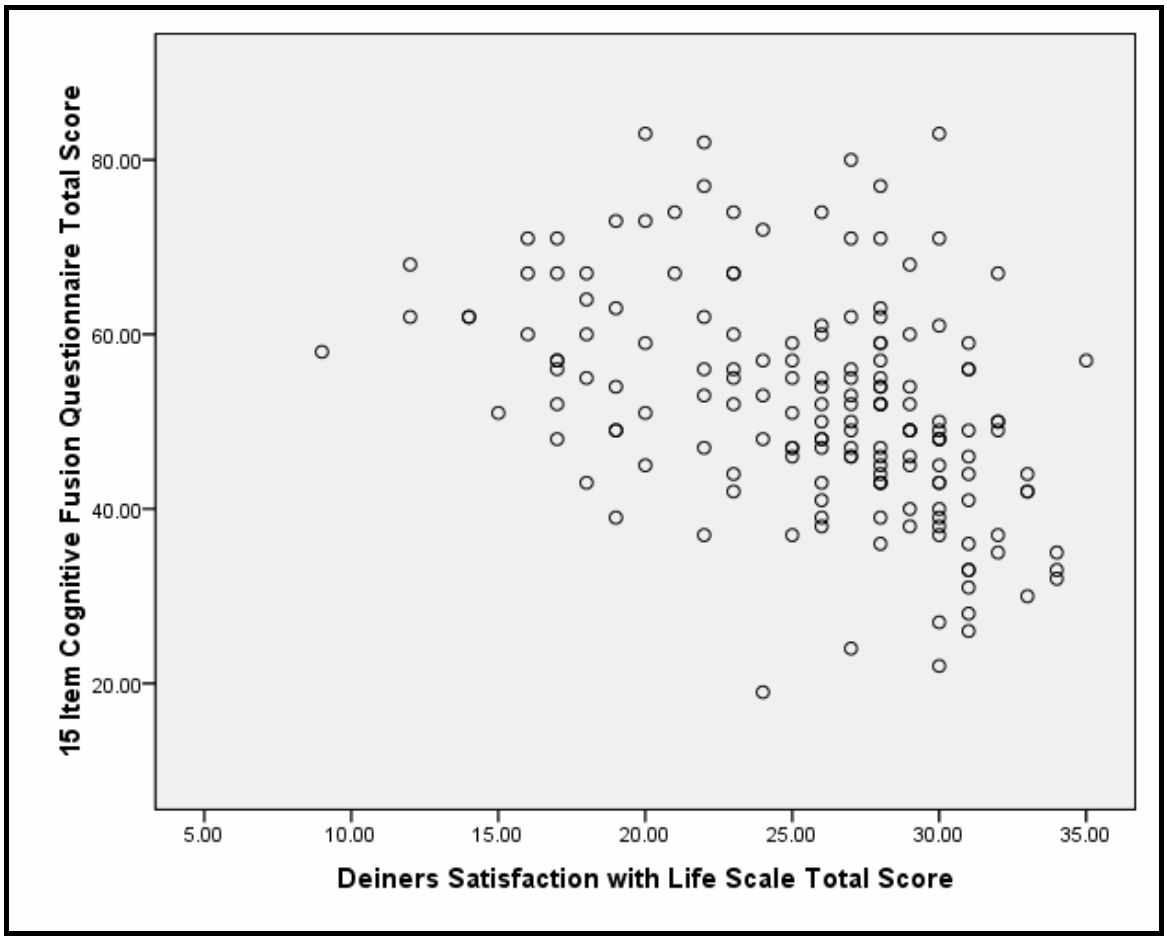

Figure 3.7: Scatter plot for the CFQ and the Deiners Satisfaction with Life Scale

3.2.11 Test of Hypothesis Two – Convergent Validity

It was expected that participants that are more fused would score higher on experiential avoidance.

Avoidance was measured by the Acceptance and Action Questionnaire (AAQ-II) (Hayes *et al.* 2004).

There was a significant positive correlation between the CFQ and the Acceptance and Action Questionnaire (Hayes *et al.* 2004) ($r = .651$; $n = 167$; $p<0.01$) (See Table 3.6). Thus participants who had higher levels of cognitive fusion as measured on the CFQ also had higher levels of experiential avoidance. Therefore the hypothesis was supported. The scatter plot in figure 3.8 depicts the correlation between the two variables.

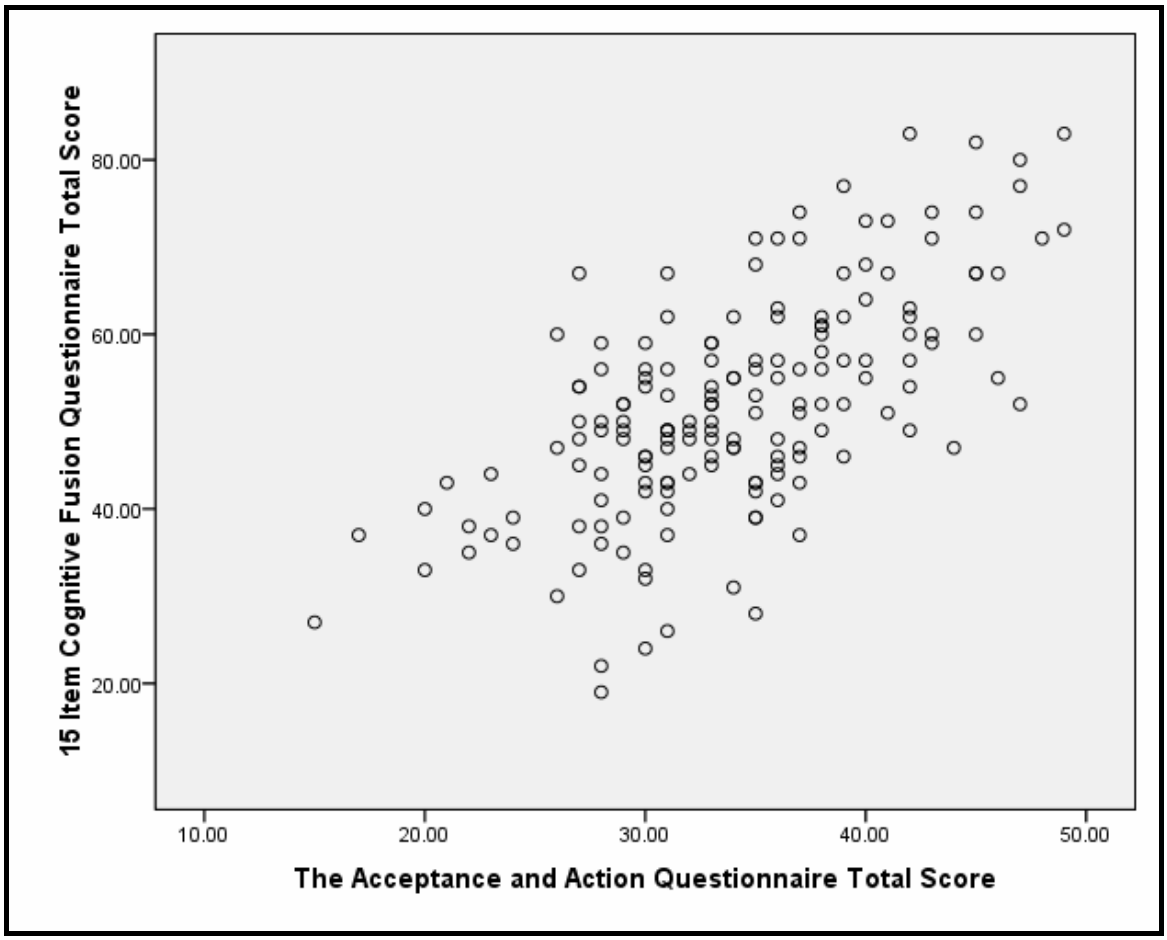

Figure 3.8: Scatter plot for the CFQ and the Acceptance and Action Questionnaire - II

3.2.12 Test of Hypothesis Three – Convergent Validity

It was expected that participants with higher levels of cognitive fusion would score higher on the TCQ (Wells and Davis, 1994).

As can be seen in Table 3.6, the correlation between the CFQ and the Thought Control Questionnaire (Wells and Davis, 1994) was positive ($r = .172$; $n = 167$; $p<0.01$). This highlights that participants who scored higher levels of cognitive fusion also scored higher responses on the Thought Control Questionnaire (Wells and Davis, 1994). Therefore the hypothesis was supported. The scatter plot depicted in figure 3.9 outlines the correlation between the two variables.

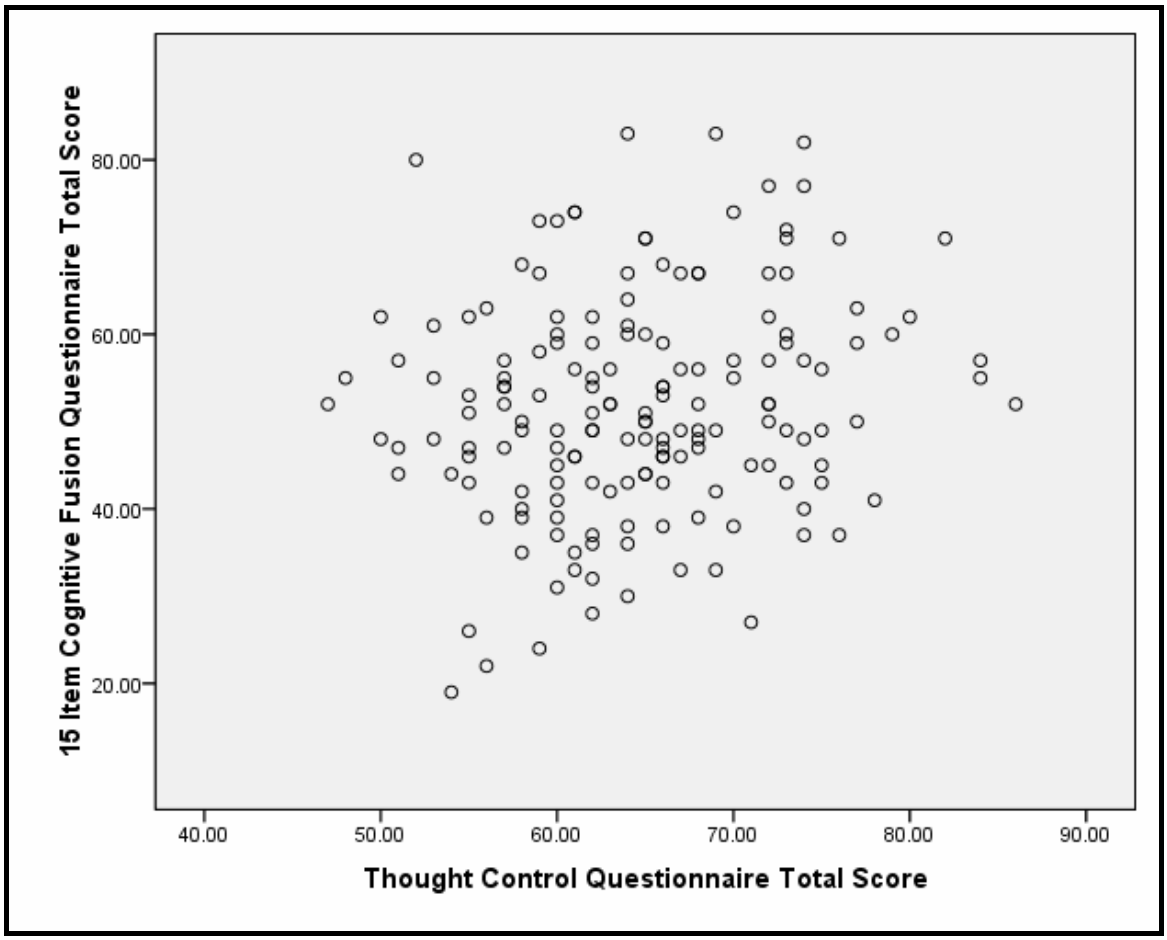

Figure 3.9: Scatter plot for the CFQ and the Thought Control Questionnaire

3.2.13 Test of Hypothesis Four – Convergent Validity

It was expected that participants that are less fused would score higher on the SMQ (Chadwick et al. 2008).

There was a correlation between the CFQ and the Southampton Mindfulness Questionnaire (Chadwick *et al. 2008*) ($r = -.792$; $n = 167$; $p<0.01$). This suggests that participants who scored lower on the CFQ scored higher on the Southampton Mindfulness Questionnaire (Chadwick *et al. 2008*). Therefore the hypothesis was supported. The scatter plot depicted in figure 3.10 outlines the correlation between the two variables.

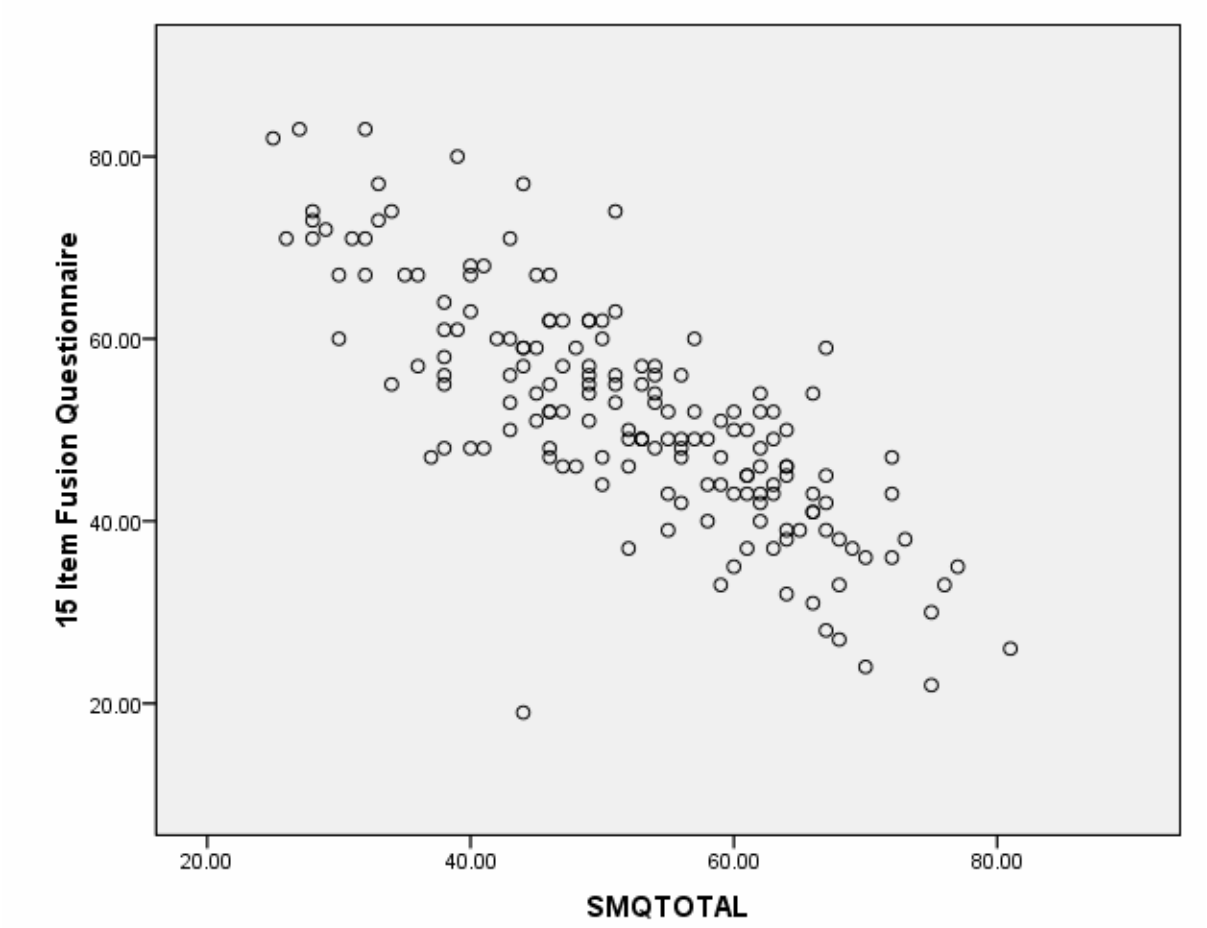

Figure 3.10: Scatter plot for the CFQ and the Southampton Mindfulness Questionnaire

3.3 Study 2 Summary of Findings

- Repeated Principal Component Analysis resulted in a two factor solution as the most appropriate grouping of the items. The items corresponding to the components were conceptually and theoretically congruent with the constructs of cognitive fusion and cognitive defusion as proposed by Hayes *et al.* (1999).

- Participants with higher levels of cognitive fusion had lower levels of life satisfaction as measured on the Dieners Satisfaction with Life Questionnaire (Diener *et al.* 1985). This hypothesis tested convergent validity.

- Participants who had higher levels of cognitive fusion also had higher levels of experiential avoidance as measured on the Acceptance and Action Questionnaire – II (Hayes *et al.* 2004). This hypothesis tested convergent validity.

- Participants who scored higher levels of cognitive fusion also had higher responses on the Thought Control Questionnaire (Wells and Davis, 1994). This hypothesis tested convergent validity.

- Participants who scored lower on the CFQ scored higher on the Southampton Mindfulness Questionnaire (Chadwick *et al. 2008*). This hypothesis tested convergent validity.

4 CHAPTER FOUR: DISCUSSION

The purpose of the present study was to develop and provide initial validation of a theoretically-based self-report measure of cognitive fusion and cognitive defusion. The construct of cognitive fusion has been defined as the process whereby one becomes entangled or fused with the literal context of their thoughts (Hayes *et al.* (1999). As previously outlined, the concept represents an important component to Hayes *et al's*. (1999) model of psychopathology. Cognitive defusion strategies enable the individual to see thoughts and feelings as essentially just experiences rather than a structured reality (e.g. rather than facts about the world or events that must be responded to). This component is central to psychological flexibility and the construct represents a core process in the ACT model. However despite the central importance to the model, both constructs could not be measured as a reliable and valid measure of the components had not been developed.

Several questionnaire based measures related to the construct of cognitive fusion and cognitive defusion were referred to and were described as having similar properties to the constructs (i.e. measure of acceptance, the *Acceptance and Action Questionnaire, AAQ* (Hayes *et al.* 2004); measures of metacognition, the *Meta-Cognitions Questionnaire, MCQ* (Hatton and Wells, 1997), the *Metacognitive Awareness Questionnaire, MAQ* (Teasdale *et al.* 2001), the *Metacognitive Awareness Inventory, MAI* (Schraw and Dennison, 1994); measures of decentering (mindfulness) the *Experiences Questionnaire, EQ* (Fresco *et al*, 2007) the *Southampton Mindfulness Questionnaire, SMQ* (Chadwick *et al.* 2008). Review of the AAQ (Hayes *et al.* 2004) concluded that while the questionnaire makes reference to the constructs of cognitive fusion and cognitive defusion the questionnaire does not capture the constructs

as a whole. Similarly, the MCQ (Hatton *et al.* 1997) measure is specific to generalised anxiety disorder, the MAQ (Teasdale *et al.* 2001) is specific to depression and the MAI (Schraw and Dennison, 1994) pertains mostly to the area of learning performance. Relatedly, the EQ (Fresco *et al.* 2007) was designed as a practical measure to assess the psychotherapy process in MBCT; and the SMQ (Chadwick *et al.* 2008) predominantly assesses mindful relating to psychotic phenomenon. The paucity of an instrument to measure relevant aspects of cognitive fusion and cognitive defusion formed the basis for this research.

The study explored the factor structure and psychometric properties of the questionnaire. The study tested content and convergent validity associated with the questionnaire. The psychometric evidence suggests that the CFQ adequately measures the constructs of cognitive fusion and cognitive defusion. Content validation by members of the ACT Special Interest Branch of the BABCP and the local ACT Interest Group, yielded high ratings of the representativeness of the components.

4.1 Factor Structure of the CFQ – Study One

The initial scale consisted of forty-two items. Sixteen of the items reflected items pertaining to the construct of cognitive defusion and twenty-six items reflecting the construct of cognitive fusion. Therefore the questionnaire contained both of Hayes *et al's.* (1999) constructs – one reflecting psychological inflexibility (i.e. cognitive fusion) and the other capturing psychological flexibility (i.e. cognitive defusion). Several iterations of Principal Component Analysis resulted in a two component solution as the most appropriate grouping of the items. Items with factor loadings less than 0.4 were removed. Two items with factor

loadings less than 0.4 were retained at the researcher's discretion. Item retention for factors loadings less than 0.4 was predominantly related to those items being theoretically related to the constructs in particular the construct of cognitive defusion. Furthermore, the items in question were given high ratings by the Expert Group at the consensus stage and rated as items that captured specific aspects of defusion. This resulted in a final scale of 24 items accounting for 44% of the variance. The Kaiser-Meyer-Olkin (KMO; Kaiser, 1974) measure of sampling adequacy indicated .91.

The first component, the fusion subscale consisted of sixteen items that accounted for 33% of the variance. This component reflected Hayes *et al's.* (1999) notion of cognitive fusion. Cognitive fusion is defined by the authors as the frequency of acting on thoughts as if they are true representations of reality. The second component, the defusion subscale consisted of eight items accounting for 11% of the variance. This component captures Hayes *et al's.* (1999) construct of cognitive defusion and the component was appropriately labelled defusion (i.e. the tendency to view thoughts as just thoughts) for this reason. Therefore, the two components were considered to be both conceptually and theoretically congruent with the authors' constructs. The questionnaire demonstrated good internal consistencies, as measured by Cronbach's alpha. An alpha of .81 was achieved for the total scale and alphas of .92 for the fusion subscale and .76 for the defusion subscale was achieved. According to De Vellis (2003), a total scale alpha of .81 is considered very good and an alpha of .92 on the fusion subscale is considered superb. The defusion subscale alpha is slightly less promising and an alpha of .76 is considered respectable (De Vellis, 2003). There were no significant gender differences in scores on either factors.

4.2 Factor Structure and Validity Analysis of the CFQ – Study Two

Several iterations of Principal Component Analysis were conducted with a separate sample of participants to further derive and established the factor structure of the questionnaire. The results of the Principal Component Analysis in study 2 provided support for the hypothesis of structural validity as suggested in study 1. The final scale derived two components with fifteen items that accounted for 54% of the variance. As in the previous study, the two components were labelled fusion and defusion and the components accounted for 40% and 14% of the variance respectively. The fusion component contained eleven items and the defusion component contained four items. The KMO (Kaiser, 1974) measure of sampling adequacy indicated .87. The fifteen item CFQ achieved a higher alpha than the total scale alpha achieved for the twenty-four item CFQ derived in study one. Reliability analysis for the 15 Item Questionnaire indicated .88, which is considered as very good according to De Vellis (2003). The fusion subscale in the fifteen items Questionnaire achieved an alpha of .91 and is categorised superb (De Vellis, 2003). Interestingly, this alpha is only marginally different from the alpha achieved on the fusion subscale in study one. However, similar to study one the defusion subscale achieved a respectable alpha of .71.

The two components derived from study one and study two were found to have a weak correlation. In the first instance one could assume that this suggests that on a conceptual level the constructs of fusion (cognitive fusion) and defusion are two independent, multi-dimensional components. However, another possibility for this may be associated with the wording of the items, in particular the use of positively and negatively worded items.

Several authors including Nunnally (1978) and De Vellis (1991) advocate the use of positively and negatively worded items in instruments to avoid response bias such as acquiescence and agreement bias (e.g. the tendency to agree with the survey items, independent of the item content). Podsakoff, MacKenzie, Lee and Podsakoff (2003, p. 884) further argue that negatively worded items act as "cognitive speed bumps that require respondents to engage in more controlled, as opposed to automatic, cognitive processing". However, several implications of using negatively worded items in instruments have been noted and include that the items worded in the opposite direction are measuring the same construct and that respondents are able to reply to positively and negatively worded items equivalently (Podsakoff *et al.* 2003). A number of authors also acknowledge that using positively and negatively worded items may introduce measurement errors that disrupt analyses and interpretations of the results (Podsakoff *et al.* 2003; Quilty, Oakman and Risko, 2006; DiStefano and Motl, 2006). More specifically the authors argue that constructs may appear multi-dimensional opposed to uni-dimensional when positively and negatively worded items are included. Podsakoff *et al.* (2003) refer to this as a method effect. It is possible in the current study that the two factors derived from the CFQ (e.g. fusion and defusion) are uni-dimensional (e.g. measuring the same construct) as opposed to multi-dimensional. In spite of the clear advantages to using negatively worded items, future studies are required to test whether method effects are present in the CFQ. Marsh (1996) and DiStefano and Motl (2006) suggest using Confirmatory Factor Analysis to overcome the shortcomings of exploratory factor analysis (i.e. the inability to differentiate competing factor structures of a scale) to examine the item wording effects.

One of the shortcomings in study two in relation to the structural coherence of the CFQ is the sample size. Bryant and Yarnold (as cited in Grimm & Yarnold, 1995) and Gorsuch (as cited in MacCallum *et al.* 1999) suggest that the subjects-to-variables (STV) should be no lower than five for the initial stage of test construction. This calculation was achieved in study one and a sample size of 425 participants was obtained. However, the sample size in study two was significantly less and comprised 167 participants accounting for less than half of the number of participants in the first study. It is arguable that a sample size that is closer to the first study should also be used when testing the hypothesis of structural coherence of a newly constructed scale. One of the advantages of ensuring this might support the likelihood that the results across studies are based on the properties of the scale being tested, rather than the size of the sample.

4.3 Validity of the CFQ – Study Two

The CFQ underwent a series of external validity analyses in particular convergent validity. Convergent validity of the CFQ was demonstrated through significant correlations with life satisfaction and experiential avoidance constructs. There was a significant moderate correlation between the CFQ and the measure of life satisfaction as measured by Diener *et al's.* (1985) SWLS. First, high scores on the CFQ were associated with lower scores on a satisfaction with life measure. This result is considered to be consistent with Hayes *et al's.* (1999) model of psychopathology. The process of cognitive fusion sucks people into prolonged and chronic psychological distress and rigidity in behavioural responding (Hayes *et al*. 1999). It is argued that as an individual's level of psychopathology becomes more entrenched, their overall satisfaction with life becomes less. This result is also consistent

with research showing that recurrent negative thinking results in greater levels of psychopathology and ultimately reduced life satisfaction (Conway *et al.* (2000); Nolen-Hoeksema *et al.* (1991); Nolen-Hoeksema, (1993); Rachman, (1998); Salkovskis, (1998).

As predicted the CFQ correlated strongly with experiential avoidance as measured by Hayes *et al's.* (2004) AAQ-II. Hayes and colleagues (1999) argue that human suffering originates from psychological inflexibility fostered by experiential avoidance and cognitive fusion. Therefore, this result is consistent and in line with the theoretical underpinnings of ACT. As previously mentioned the AAQ and the AAQ-II incorporate several ACT processes (Hayes *et al.* 2004) including items that target links between experiential avoidance and excessively negative evaluations of private experience, inaction, the need for cognitive and emotional control and the literalness of thought (Barnes-Holmes *et al.* 2004). When reviewing the items included in the AAQ-II with items in the CFQ, it appears that some of the questions overlap (i.e. AAQ-II item "*I worry about not being able to control my worries and feelings*" is similar in content to the CFQ item "*I need to control the thoughts that come into my head*"). Furthermore, the AAQ-II item "*My thoughts and feelings do not get in the way of how I want to live my life*" is similar in content to the CFQ item "*I am able to do what's important in my life even when I have upsetting thoughts*". It may be that the AAQ-II and the current questionnaire are measuring similar properties and this may account for the large correlation between the two measures. This may indeed be the case but as suggested previously, the sample size used to determine this result was relatively small (i.e. n = 167). It is likely that further research, conducted with larger sample sizes will be necessary to help confirm this. Nevertheless, when the items were examined and reviewed it is clear that the CFQ

predominantly targets the constructs of cognitive fusion and cognitive defusion and the items are reflective of this.

The CFQ related highly to measures concerning individual's beliefs about worry (the Thought Control Questionnaire, TCQ; Wells and Davis, 1994) and mindful responding to unpleasant thoughts and images (the Southampton Mindfulness Questionnaire, SMQ; Chadwick *et al.* 2008). The CFQ correlated positively, albeit weakly, with the TCQ (Wells and Davis, 1994).

As expected the CFQ also correlated significantly and very strongly with the SMQ (Chadwick *et al*. 2008). When reviewing the items in both questionnaires (i.e. the SMQ and the CFQ) it would appear that the items are indeed very similar. Therefore, it is possible that the CFQ and the SMQ are measuring the same thing and that the CFQ, at this stage in the scales development, is not measuring anything unique. However, it should be noted that the SMQ was only published after the construction of the CFQ. Nevertheless, on further examination there are several distinct properties of the CFQ that indicate that the scale is adding something different to the literature. One such difference between the two scales is that of the theoretical model that informs the development of the CFQ.

Both the SMQ and the current measure predominantly target the relationship between a person and their thoughts. The SMQ also incorporates the theme of decentering from thoughts, which as previously described is related to the construct of defusion. Hayes *et al.* (1999) acknowledge that the concepts of decentering, mindfulness and cognitive defusion are

strongly related processes but the exact dividing line between these processes is not yet understood. However, the concept of cognitive fusion is embedded in Relational Frame Theory (RFT) (i.e. the extent to which one becomes entangled or fused with the literal context of their thoughts) (Hayes *et al*. 1999). Cognitive defusion is the process of undermining the behaviour regulatory functions and literal believability of verbally entangled events. This is thought to result in greater psychological flexibility. The authors argue that this flexibility allows the individual to achieve contact with the present moment more fully as a conscious human being and to change or persist with behaviour when doing so serves valued ends (Hayes *et al*. 1999). This represents a core difference between the CFQ and the SMQ. The mindfulness measures that are currently available target the mindful responding aspect but they do not measure the literality and behavioural regulation aspect. The CFQ combines items that measure each of these phenomena and this is implicit in the notions of fusion and defusion. This suggests that while the two processes overlap, cognitive defusion is not identical to the concept of mindfulness and therefore the CFQ is measuring something unique.

As previously outlined, the SMQ was designed to measure the relationship between distressing thoughts and images that are central to the phenomena found in clinical disorders in particular psychosis. Moreover, it was developed as a tool to assess mindful responding related to psychotic phenomena. A central strength of the CFQ is that it is not domain specific in that the CFQ is not limited to just one type of thought or even one domain of thinking. Rather, the CFQ targets the concept of cognition more generally, focusing particularly on the literal context of thoughts, one's perspective on their thoughts and

cognitions behavioural regulatory functions. This represents further differences between the two scales.

4.4 Clinical and Research Implications

The CFQ was developed for both clinical and research purposes and once the validity and reliability of the instrument are more fully established, the CFQ may serve as a useful tool in both clinical and research settings. The self-report format and the small number of items represent inviting and time saving characteristics of the measure that should make the instrument attractive for use in a wide variety of settings. Clinicians working in the field of ACT may find a short measure on cognitive fusion useful for assessing how cognitively fused or defused one is with their mental content. As previously mentioned the only ACT tool available is the AAQ or the shortened version, the AAQ-II (Hayes *et al.* 2004) and both measures are not restricted to the constructs of cognitive fusion and cognitive defusion. The instrument may also serve as a pre- and post therapy measure for both clinician and client to assess the effectiveness of the ACT model and the techniques that are incorporated within the model. Clinical research in this form would join the growing body of evidence that suggests the successful use of ACT with a wide range of clinical disorders including depression (Zettle and Hayes, 1986; Zettle and Raines, 1989), workplace stress (Bond and Bunce, 2000), chronic pain (Geiser, 1992; Vowles and McCracken, 2008; Wicksell, Ahlqvist, Bring, Melin and Olsson, 2008), anxiety disorders (Block and Wulfert, 2000; Zettle, 2003) schizophrenia (Bach and Hayes, 2002 and Gaudiano and Herbert, 2006), smoking (Brown, Palm, Strong, Lejuez, Kahler, Zvolensky, Hayes, Wilson and Gifford, 2008), substance abuse (Luoma, Kohlenberg, Hayes, Bunting and Rye, 2008) and diabetes (Gregg, Callaghan, Hayes and Glenn-Lawson, 2007).

Similarly the ACT research base would benefit from an instrument that solely targets the constructs of cognitive fusion and cognitive defusion. The current measure could help to develop further micro-studies focusing on these constructs and it could also isolate the process of cognitive defusion to further support how the techniques work in accordance with the ACT theory. Research in this area could further accompany previous micro studies conducted on cognitive defusion including Bach and Hayes (2002); Gaudiano and Herbert, (2006); Masuda *et al.* (2004); Hayes *et al.* (1999); Takahasi *et al.* (2002).

4.5 Limitations and Future Directions

A fundamental limitation on the conclusions drawn from this study is that the research is preliminary in nature. In the formation and validation of all scales, replication is the imperative to further validation. Further research with the CFQ is essential in order for the instrument to be considered a valid and reliable indicator of the constructs of cognitive fusion and cognitive defusion as proposed by Hayes *et al.* (1999).

The CFQ was developed and validated predominantly on a university student cohort. In study one some attempt was made to select participants from the community. This option was explored to yield a higher response rate and to encourage the selection of participants from a more diverse sample group. Unfortunately, this option was not possible in study two owing to the researcher having 'used up' her community participants. Furthermore, the researcher was limited by the range of participants she could select due to the NHS and Edinburgh University ethical constraints.

A further limitation of study two was that it was predominantly limited to female undergraduate and postgraduate students. This result is not surprising as significantly higher rates of females can be found studying for Psychology Undergraduate Degrees and Clinical Psychology Post-Graduate Degrees. Again, the researcher was limited to the types of University Courses that she could select from due to ethical constraints but undoubtedly, higher representations from males would further support the development of this scale. Therefore, at this stage in the development of the CFQ, the questionnaire may not be generaliseable to other groups and may be specific to a student cohort.

An important endeavour for future research would be the need to evaluate and validate the CFQ with other non-student, non-clinical populations including adults (ages 18-64), older adults (>65) and adolescent populations. Further replication in a treatment-seeking sample would also be necessary. The above replication would further examine the reliability and validity of the CFQ and it would also allow for an examination of the CFQ with other measures of psychopathology.

Both studies also failed to measure ethnicity. Future research will need to be done to illustrate that the cognitive fusion and cognitive defusion items found here perform as robustly across differences in ethnicity.

An important aspect of reliability that was not tested in this research was test-retest reliability. The researcher was aware of this shortcoming when conducting the above research but due to the participant selection procedures it was impossible to ensure that the

same participant would complete the same questionnaires at the prior scheduled interval of three weeks. This shortcoming has important implications. At this stage in the instrument's development the measure still lacks clarity as to whether the psychometric properties of the scale are sound. Sufficient test-retest reliability will need to be examined for the scale to further develop its reliability base.

Another shortcoming of the above research was the failure to address any aspect of discriminant validity (i.e. to statistically test whether two constructs differ) (Nunnally and Berstein, 1994). This will need to be explored in future research. It would be particularly interesting to explore how the current questionnaire is related to questionnaires measuring the constructs of mindfulness. The Kentucky Inventory of Mindfulness Scale (KIMS) (Baer, Smith and Allen, 2004) measures four mindfulness skills that include observing, describing, acting with awareness and accepting without judgement. It would be interesting to see how the CFQ performs with this questionnaire and to see how the factors in the CFQ perform with the factors in the KIMS. This would further establish the validity of the CFQ.

4.6 Conclusions

The above study sought to develop and validate a scale to measure Hayes *et al's.* (1999) constructs of cognitive fusion and cognitive defusion. Using Principal Component Analysis in two independent samples a questionnaire of two components consisting of fifteen items was established. Cronbach's alpha for the total scale was .88. The items were considered to be both conceptually and theoretically congruent with the functions of cognitive fusion and cognitive defusion as proposed by Hayes *et al.* (1999).

The study tested content and convergent validity associated with the scale, and significant relationships were found to exist between a measure of life satisfaction, beliefs about worry, mindful responding to unpleasant thoughts and images and levels of experiential avoidance. The study concludes that the CFQ has performed well regardless of it being specific to a student cohort. An important endeavour for future research would be the need to evaluate and validate the CFQ with other non-student, non-clinical as well as clinical populations including adult (ages 18-64), older adult (>65) and adolescent populations.

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APPENDIX 1 *Item Development Stage – Initial Items and Initial Questionnaire*

Dear ACT Colleague,

We at the University of Edinburgh are beginning a project to try and construct a self-report measure of cognitive fusion / defusion. We are at the preliminary stage of item generation. It would help us greatly if you could read the items we have generated and rate them according to how well you think they represent the construct of cognitive fusion. Some of the items are deliberately worded to reflect defusion, these of course would be reverse scored in the final version. Our intention is to use factor analysis to reduce the items to a manageable number and of course to perform reliability analyses and correlational analyses with other measures to determine its external validity.

We thank you for your help

David Gillanders & Maria Dempster, University of Edinburgh

How representative of cognitive fusion / defusion are these items?

	Not at all	*A little*	*Moderately*	*Highly*
1. I get so caught up in my thoughts that I don't see other people's point of view.	1	2	3	4
2. People say that I analyse situations too much.	1	2	3	4
3. My thoughts cause me distress or emotional pain.	1	2	3	4
4. Even when my mind is going over and over the same thing, I understand that thoughts are just thoughts.	1	2	3	4
5. Even when I am mistaken about a situation, I find it hard to let go of how I'm thinking about it.	1	2	3	4
6. My thoughts about certain situations can change relatively quickly.	1	2	3	4
7. I place great importance on my thoughts.	1	2	3	4

8. I find it hard to get things out of my mind.	1	2	3	4
9. My opinions about things are rarely fixed.	1	2	3	4
10. I tell myself that I shouldn't be thinking the way I'm thinking.	1	2	3	4
11. I frequently try to change the way I'm thinking.	1	2	3	4
12. I am able to distance myself from my thoughts as I know that they will become less important eventually.	1	2	3	4
13. I get very caught up in my thought processes.	1	2	3	4
14. I can see that my thoughts are just thoughts.	1	2	3	4
15. I make judgements about whether my thoughts are good or bad.	1	2	3	4
16. I think some thoughts are bad and inappropriate.	1	2	3	4
17. I find myself preoccupied with the future or the past.	1	2	3	4
18. If something upsets me I think about it so much that other memories from the past emerge.	1	2	3	4
19. I get upset with myself for having certain thoughts.	1	2	3	4
20. I find it difficult to ignore certain thoughts.	1	2	3	4
21. I feel like my thoughts need to change before I can have a good life.	1	2	3	4
22. I am able to rationalise irregular thoughts.	1	2	3	4
23. I am able to move on from my thoughts.	1	2	3	4
24. I tend to get very entangled in my thoughts.	1	2	3	4
25. I am able to stand back from thought processes that are overwhelming.	1	2	3	4
26. I am able to move on from certain thoughts relatively easily.	1	2	3	4
27. Even when I'm upset I am able to see that some thoughts may not be true.	1	2	3	4
28. I am constantly aware of what I'm thinking	1	2	3	4
29. I can easily dismiss certain thoughts.	1	2	3	4
30. When I find myself dwelling on things, I am able to move on relatively quickly.	1	2	3	4

31. I do not brood over past events.	1	2	3	4
32. I do not grasp on to my thoughts and pick them apart.	1	2	3	4
33. My mind is capable of having unusual or out of the ordinary thoughts but I can easily dismiss them.	1	2	3	4
34. I have to know the reasons why things happen	1	2	3	4
35. I am very aware of what I'm thinking.	1	2	3	4
36. I spend very little time analysing situations.	1	2	3	4
37. My thoughts must be right before I act	1	2	3	4
38. I find it easy to switch off from my thoughts.	1	2	3	4
39. I find it easy to view my thoughts from different angles.	1	2	3	4
40. My thoughts just come and go and I'm not too attached to them.	1	2	3	4
41. I see my thoughts as facts.	1	2	3	4
42. There are certain areas in my life where My thoughts are rigid or inflexible.	1	2	3	4
43. I never act against my thoughts	1	2	3	4
44. I very rarely get caught up in thinking.	1	2	3	4

If there are ways of wording items that we have not managed to capture that you would ideally wish to see on such a measure, please write them below.

APPENDIX 2 *Cognitive Fusion Questionnaire – 42 Items*

F-42

Below you will find a list of statements. Please rate how true each statement is for you by circling a number next to it. Use the scale below to make your choice.

1	2	3	4	5	6	7
never true	very seldom true	seldom true	sometimes true	frequently true	almost always true	always true

1. My thoughts cause me distress or emotional pain	1	2	3	4	5	6	7
2. I tell myself that I shouldn't be thinking the way I'm thinking	1	2	3	4	5	6	7
3. Even when I am having distressing thoughts, I know that they may become less important eventually	1	2	3	4	5	6	7
4. I find myself preoccupied with the future or the past	1	2	3	4	5	6	7
5. I make judgements about whether my thoughts are good or bad	1	2	3	4	5	6	7
6. Even when I'm having upsetting thoughts, I can see that those thoughts may not be literally true	1	2	3	4	5	6	7
7. I get upset with myself for having certain thoughts	1	2	3	4	5	6	7
8. I feel like my thoughts need to change before I can have a good life	1	2	3	4	5	6	7
9. I find it easy to view my thoughts from a different perspective	1	2	3	4	5	6	7
10. I tend to get very entangled in my thoughts	1	2	3	4	5	6	7
11. I think some of my thoughts are bad or inappropriate	1	2	3	4	5	6	7
12. I do not over-analyse my thoughts	1	2	3	4	5	6	7
13. My thoughts are facts	1	2	3	4	5	6	7
14. It's such a struggle to let go of upsetting thoughts even when I know that letting go would be helpful	1	2	3	4	5	6	7
15. My thoughts just come and go and I'm not too attached to them	1	2	3	4	5	6	7
16. I get so caught up in my thoughts that I am unable to do the things that I most want to do	1	2	3	4	5	6	7
17. I over-analyse situations to the point where it's unhelpful to me	1	2	3	4	5	6	7
18. I can watch my thoughts from a distance without getting caught up in them	1	2	3	4	5	6	7
19. There are certain areas in my life where my thoughts are rigid or inflexible	1	2	3	4	5	6	7
20. I get so caught up in my thoughts that I don't see other people's point of view	1	2	3	4	5	6	7

1	2	3	4	5	6	7
never true	very seldom true	seldom true	sometimes true	frequently true	almost always true	always true

21. I am able to do what's important in my life even when I have upsetting thoughts	1	2	3	4	5	6	7
22. I struggle with my thoughts	1	2	3	4	5	6	7
23. I am my thoughts	1	2	3	4	5	6	7
24. I can be aware of my thoughts without necessarily reacting to them	1	2	3	4	5	6	7
25. I take the content of my thoughts to be the truth	1	2	3	4	5	6	7
26. If I think I cannot do something then I will not try to do it	1	2	3	4	5	6	7
27. I am able to stand back from thoughts that are overwhelming me	1	2	3	4	5	6	7
28. I get so caught up in my thoughts that I forget what I'm actually doing	1	2	3	4	5	6	7
29. I tend to react very strongly to my thoughts	1	2	3	4	5	6	7
30. I am able to move on from troubling thoughts relatively easily	1	2	3	4	5	6	7
31. My thoughts are who I am	1	2	3	4	5	6	7
32. I believe the thoughts that pop into my head	1	2	3	4	5	6	7
33. My mind is capable of having upsetting thoughts, but I can live with them	1	2	3	4	5	6	7
34. I need to control the thoughts that come into my head	1	2	3	4	5	6	7
35. Once I've thought about something upsetting its difficult for me to focus on anything else	1	2	3	4	5	6	7
36. When I catch myself dwelling on things, I am able to let go of dwelling relatively quickly	1	2	3	4	5	6	7
37. I brood over past events	1	2	3	4	5	6	7
38. I can do difficult things even if my thoughts say they are impossible to do	1	2	3	4	5	6	7
39. I can think about something stressful without getting stressed	1	2	3	4	5	6	7
40. There is more to me than my thoughts	1	2	3	4	5	6	7
41. I worry a great deal	1	2	3	4	5	6	7
42. Its possible for me to have negative thoughts about myself and still know that I am an OK person	1	2	3	4	5	6	7

Thank you for completing this questionnaire

APPENDIX 3 *Demographic Questionnaire*

Demographic Questionnaire

1. **Gender** (please circle)

Female Male

2. **Age Group** (please circle)

17 – 24 25-34 35-44 45-55 Over 55

APPENDIX 4 *The Southampton Mindfulness Questionnaire (SMQ) (Chadwick, Hember, Symes, Peters, Kuipers and Dagnan, 2008).*

The Southampton Mindfulness Questionnaire (SMQ)

Usually, when I have distressing thoughts or images…..

	Agree Totally	Agree Strongly	Agree Slightly	Unsure	Disagree Slightly	Disagree Strongly	Disagree Totally
1. I am able just to notice them without reacting							
2. They take over my mind for quite a while afterwards							
3. I judge the thought/image as good or bad							
4. I feel calm soon after							
5. I am able to accept the experience							
6. I get angry that this happens to me							
7. I notice how brief thoughts and images really are							
8. I judge myself as good or bad, depending what the thought/image is about							
9. I 'step back' & am aware of the thought or image without getting taken over by it							
10. I just notice them and let them go							
11. I accept myself the same whatever the thought/image is about							
12. In my mind I try and push them away							
13. I keep thinking about the thought or image after it's gone							
14. I find it so unpleasant I have to distract myself & not notice them							
15. I try just to experience the thoughts or images without judging them							
16. I lose myself in the thought/images							

APPENDIX 5 *The Dieners Satisfactions with Life Scale (SWLS) (Diener, Emmons, Larsen and Griffin, 1985).*

The Diener's Satisfaction with Life Scale

Below are five statements that you may agree or disagree with. Using the 1 - 7 scale below, indicate your agreement with each item by placing the appropriate number on the line preceding that item. Please be open and honest in your responding.

- 7 - Strongly agree
- 6 - Agree
- 5 - Slightly agree
- 4 - Neither agree nor disagree
- 3 - Slightly disagree
- 2 - Disagree
- 1 - Strongly disagree

____ In most ways my life is close to my ideal.

____ The conditions of my life are excellent.

____ I am satisfied with my life.

____ So far I have gotten the important things I want in life.

____ If I could live my life over, I would change almost nothing.

APPENDIX 6 *The Acceptance and Action Questionnaire (AAQ-II) (Hayes, Strosahl, Wilson, Bisset, Pistorello, Toarmino, Polusny, Dykstra, Batten, Bergan, Stewart, Zvolensky, Eifert, Bond, Forsyth, Karekla and McCurry (2004).*

AAQ-2

Below you will find a list of statements. Please rate how true each statement is for you by circling a number next to it. Use the scale below to make your choice.

1	2	3	4	5	6	7
never true	very seldom true	seldom true	sometimes true	frequently true	almost always true	always true

1.	Its OK if I remember something unpleasant.	1	2	3	4	5	6	7
2.	My painful experiences and memories make it difficult for me to live a life that I would value.	1	2	3	4	5	6	7
3.	I'm afraid of my feelings.	1	2	3	4	5	6	7
4.	I worry about not being able to control my worries and feelings.	1	2	3	4	5	6	7
5.	My painful memories prevent me from having a fulfilling life.	1	2	3	4	5	6	7
6.	I am in control of my life.	1	2	3	4	5	6	7
7.	Emotions cause problems in my life.	1	2	3	4	5	6	7
8.	It seems like most people are handling their lives better than I am.	1	2	3	4	5	6	7
9.	Worries get in the way of my success.	1	2	3	4	5	6	7
10.	My thoughts and feelings do not get in the way of how I want to live my life.	1	2	3	4	5	6	7

APPENDIX 7 *The Thought Control Questionnaire (TCQ) (Wells and Davis, 1994).*

THOUGHT CONTROL QUESTIONNAIR (TCQ)

Most people experience unpleasant and/or unwanted thoughts (in verbal and/or picture form). Which can be difficult to control. We are interested in the techniques that you *generally* use to control such thoughts.

Below are a number of things that people do to control these thoughts. Please read each statement carefully, and indicate how often you use each technique by *circling* the appropriate number. There are no right or wrong answers. Do not spend too much time thinking about each one.

When I experience an unpleasant / unwanted thought:

		Never	Sometimes	Often	Almost always
1	I call to mind positive images instead	1	2	3	4
2	I tell myself not to be so stupid	1	2	3	4
3	I focus on the thought	1	2	3	4
4	I replace the thought with a more trivial bad thought	1	2	3	4
5	I don't talk about the thought to anyone	1	2	3	4
6	I punish myself for thinking the thought	1	2	3	4
7	I dwell on other worries	1	2	3	4
8	I keep the thought to myself	1	2	3	4
9	I occupy myself with work instead	1	2	3	4
10	I challenge the thought's validity	1	2	3	4
11	I get angry at myself for having the thought	1	2	3	4
12	I avoid discussing the thought	1	2	3	4
13	I shout at myself for having the thought	1	2	3	4
14	I analyse the thought rationally	1	2	3	4
15	I slap or pinch myself to stop the thought	1	2	3	4
16	I think pleasant thoughts instead	1	2	3	4
17	I find out how my friends deal with these thoughts	1	2	3	4
18	I worry about more minor things instead	1	2	3	4
19	I do something that I enjoy	1	2	3	4
20	I try to reinterpret the thought	1	2	3	4
21	I think about something else	1	2	3	4
22	I think more about the more minor problems I have	1	2	3	4
23	I try a different way of thinking about it	1	2	3	4
24	I think about past worries instead	1	2	3	4
25	I ask my friends if they have similar thoughts	1	2	3	4
26	I focus on different negative thoughts	1	2	3	4
27	I question the reasons for having the thought	1	2	3	4
28	I tell myself that something bad will happen if I think the thought	1	2	3	4
29	I talk to a friend about the thought	1	2	3	4
30	I keep myself busy	1	2	3	4

APPENDIX 8 *Letter Documenting Approval from North of Scotland Research Ethics*

North of Scotland Research Ethics Committees
Summerfield House
2 Eday Road
Aberdeen
AB15 6RE

Telephone: 01224 558480
Facsimile: 01224 558609
Email: nosres@nhs.net

NHS
Grampian

26 May 2008

Mrs Maria A Dempster
Mrs M A Dempster
NHS Grampian
Department of Clinical and Counselling Psychology,
Royal Cornhill Hospital
Aberdeen
AB25 2ZH

Dear Mrs Dempster

Full title of study: **The Development and Validation of a Scale to Measure Cognitive Fusion**
REC reference number: **08/S0802/74**

Thank you for your letter of 20th May 2008, responding to the Committee's request for further information on the above research and submitting revised documentation, subject to the conditions specified below.

Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised.

Conditions of the favourable opinion

The favourable opinion is subject to the following conditions being met prior to the start of the study.

Management permission or approval must be obtained from each host organisation prior to the start of the study at the site concerned.

Management permission at NHS sites ("R&D approval") should be obtained from the relevant care organisation(s) in accordance with NHS research governance arrangements. Guidance on applying for NHS permission is available in the Integrated Research Application System or at http://www.rdforum.nhs.uk.

We would also like to inform you that we consult regularly with stakeholders to improve our service. If you would like to join our Reference Group please email referencegroup@nres.npsa.nhs.uk.

08/S0802/74	Please quote this number on all correspondence

With the Committee's best wishes for the success of this project

Yours sincerely

p.p. **Dr Sheila A Simpson**
Chair

APPENDIX 9 *Letter Documenting Approval from NHS Grampian Research & Development Committee*

Research and Development Foresterhill House Annexe
Foresterhill
Aberdeen
AB25 2ZB

NHS Grampian

Date 20/06/2008
Ethics :08/S0802/074
R&D Ref:2008PC010

Mrs Maria Dempster
Dept of Clinical and Counselling
Royal Cornhill Hospital
Aberdeen
AB25 2ZH

Enquiries to Omotunde Funsho
Extension 53846
Direct Line 01224 553846
Email omotundefunsho@nhs.net

Dear Mrs Dempster,

Project title: The development and validation of a scale to measure cognitive fusion

Thank you very much for sending all relevant documentation. I am pleased to confirm that the project is now registered with the NHS Grampian Research & Development Office. The project has R & D Management Approval to proceed locally.

Please note that if there are any other researchers taking part in the project that are not named on the original Ethics application, please advice the Ethics Committee in writing and copy the letter to us so that we may amend our records and assess any additional costs.

Wishing you every success with your research.

Yours sincerely

Omotunde Funsho
Data Co-ordinator

APPENDIX 10 *Letter Documenting Approval from Edinburgh University Psychology Department*

27 March 2008

Psychology
School of Philosophy, Psychology and Language Sciences
University of Edinburgh
7 George Square
Edinburgh EH8 9JZ
Tel +44 (0)131 650 3451
Fax +44 (0)131 650 3461
P.G.Caryl@ed.ac.uk

Mrs Maria Dempster
Trainee Clinical Psychologist
Block A
Clinical and Counselling Psychology
Department
Royal Cornhill Hospital
Aberdeen
AB25 2ZH

Dear Maria,

Proposed research project at Psychology, PPLS, University of Edinburgh

This is to confirm that I don't in principle see any problems with this proposal.

I would expect my successor as Psychology 1 course organiser to be prepared to give you access to the Psych 1 class at some of the early lectures in order to pilot the initial questionnaire. The size of this class is expected to be 250-300 (capped at 315), so it should be large enough for your purpose.

For the second set of questionnaires, I think you may need to use either BOTH Y2 and Y3, or BOTH Y4 and Y3 students, as the third year class may be a little too small for your needs (particularly if we assume you'll not get a full return of everything). I'd suggest that the Y3+Y4 combination would be more appropriate - as the Y2s have a lot on their plate without this additional commitment - however in principle I'd be prepared as Y2 organiser to give the go-ahead if it turned out that the Y2+Y3 combination was necessary, and again I'd expect my successor to take a similar view.

30-40 min is quite a lot for purely voluntary participation. You might want to think whether some quid pro quo (e.g. a chance to win something, not a standard payment for everyone) was appropriate for the students who do the second batch of questionnaires.

I'll let you wait for Morag Donaldson's comments as HOD, she's on holiday at present.

Yours sincerely,

Dr. P.G. Caryl (Course organiser, Psychology 1 and Psychology 2)

APPENDIX 11 *Participant Information Sheet - Study One*

The University of Edinburgh

The Development of a Scale to Measure Cognitive Fusion

Information for Prospective Participants

Thank you for reading this.

♦Introduction ♦

You are being invited to take part in a research study which involves the construction and validation of a questionnaire measuring cognitive fusion. Previous research has suggested that the degree to which people get caught up in their own thoughts and feelings is related to their mental well being, and yet we do not currently have a good way of measuring this. We are trying to develop a questionnaire measure of this phenomenon, which is known as "Cognitive Fusion". This study is being undertaken for educational purposes and is in part contribution towards a doctorate degree in clinical psychology in conjunction with the University of Edinburgh and NHS Grampian. Before you decide if you would like to participate it is important that you know a bit more about the study and what participation will involve. Please take time to read the following information carefully and raise any questions you may have with the study researcher (contact details are provided at the end of this sheet). Please ask if there is anything you are unclear about or if you would like more information.

♦What is the study about? ♦

While there have been several measures that have already been developed that assesses ones individual relationships with ones mental content, there is not a self-report questionnaire which currently measures how fused one is with their thoughts. The aim of the research is to establish whether we can accurately measure cognitive fusion using a paper and pencil questionnaire. We also want to establish the relationship between cognitive fusion and other aspects of thinking, which will be measured using other established questionnaires.

♦Why have I been chosen? ♦

You have been invited because you are an Undergraduate Psychology Student at Edinburgh University.

♦Do I have to take part in the study?♦

Participation in this study is entirely voluntary. This information sheet is for you to keep and will help you decide if you would like to take part.

♦What will participation involve? ♦

If you would like to take part then all you will have to do is complete a pack of paper and pencil questionnaires. You will only be asked to complete the questionnaires once. The questionnaire asks about different aspects of your thoughts. Your responses to all of these will be entirely confidential, and should take approximately 5 minutes to complete.

♦What are the possible benefits of taking part?♦

The information you provide will be extremely valuable in helping us to develop a self-report measure of cognitive fusion. It will allow us to compare the measure with other questionnaires to establish the relationship between Cognitive Fusion and other aspects of thinking and feeling. The successful development of the fusion questionnaire will lead to better assessment of this for patients and will also make future research in this area easier, due to us having a well established tool for measuring this important phenomenon. As our research knowledge progresses we are often able to refine our understanding of psychological therapy, which can lead to better treatments for patients in the future.

♦Will my participation in the study be kept confidential?♦

The information you provide will be kept **strictly confidential**. You will not be personally identified in any of the study results or reports. The only person with direct access to your information will be the study researcher and her supervisors. All of the information held by the researcher will be held on a protected database.

Please note: You may wish to provide your name and address if you wish to receive a written summary of the results of this research. Your contact details will remain strictly confidential and will not be made known to anyone outwith the research team.

♦What will happen to the results of the study?♦

The results will be included in a doctoral thesis submitted to the University of Edinburgh by the study researcher. You will not be identified in this, or in any other report resulting from the study. A brief summary of the results will be made available to all those who participated in the study, if requested. You will not be identified in this summary.

♦Who else knows about the study? ♦

The study has been reviewed by NHS Grampian Research Ethics Committee, and by the University of Edinburgh Doctorate in Clinical Psychology Programme Team.

♦What should I do now? ♦

If you wish to take part: Please complete the enclosed questionnaires (within one month) and return this in the stamped addressed envelope.

If you do not wish to take part: We would like to thank you for taking the time to read through this information sheet. You need do nothing more. Your decision not to take part is completely respected.

♦Who can I contact? ♦

If you have been affected by anything in the questionnaire then please feel free to contact the Study Researcher on the telephone number given below.

If you have any queries about any aspect of the study or require further information, again, please do not hesitate to contact us at the address given below:

Mrs Maria Dempster
Trainee Clinical Psychologist / Study Researcher
Clinical & Counselling Psychology Department
Royal Cornhill Hospital
Cornhill Road
Aberdeen
AB25 2ZH

Telephone: 01224 557219

Email: maria.dempster@nhs.net

Dr David Gillanders
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Dr George Deans
Clinical Supervisor
Chartered Clinical Psychologist
Clinical & Counselling Psychology Department
Royal Cornhill Hospital
Cornhill Road
Aberdeen
AB25 2ZH

Telephone : 01224 557219
Email : GEORGE.DEANS@gpct.Grampian.scot.nhs.uk

This information sheet is for you to keep. Thank you for taking the time to read this letter.

APPENDIX 12 *Participant Information Sheet – Study Two*

The University of Edinburgh

The Development of a Scale to Measure Cognitive Fusion

Information for Prospective Participants

Thank you for reading this.

♦Introduction ♦

You are being invited to take part in a research study which involves the construction and validation of a questionnaire measuring cognitive fusion. Previous research has suggested that the degree to which people get caught up in their own thoughts and feelings is related to their mental well being, and yet we do not currently have a good way of measuring this. We are trying to develop a questionnaire measure of this phenomenon, which is known as "Cognitive Fusion". This study is being undertaken for educational purposes and is in part contribution towards a doctorate degree in clinical psychology in conjunction with the University of Edinburgh and NHS Grampian. Before you decide if you would like to participate it is important that you know a bit more about the study and what participation will involve. Please take time to read the following information carefully and raise any questions you may have with the study researcher (contact details are provided at the end of this sheet). Please ask if there is anything you are unclear about or if you would like more information.

♦What is the study about? ♦

While there have been several measures that have already been developed that assesses ones individual relationships with ones mental content, there is not a self-report questionnaire which currently measures how fused one is with their thoughts. The aim of the research is to establish whether we can accurately measure cognitive fusion using a paper and pencil questionnaire. We also want to establish the relationship between cognitive fusion and other aspects of thinking, which will be measured using other established questionnaires.

♦Why have I been chosen? ♦

You have been invited because you are an Undergraduate Psychology Student at Edinburgh University.

♦Do I have to take part in the study?♦

Participation in this study is entirely voluntary. This information sheet is for you to keep and will help you decide if you would like to take part.

♦What will participation involve? ♦

If you would like to take part then all you will have to do is complete a pack of paper and pencil questionnaires. You will only be asked to complete the questionnaires once. The questionnaires ask a range of questions about your satisfaction with life and different aspects of your thoughts. Your responses to all of these will be entirely confidential, and should take approximately 30 minutes to complete.

♦What are the possible benefits of taking part?♦

The information you provide will be extremely valuable in helping us to develop a self-report measure of cognitive fusion. It will allow us to compare the measure with other questionnaires to establish the relationship between Cognitive Fusion and other aspects of thinking and feeling. The successful development of the fusion questionnaire will lead to better assessment of this for patients and will also make future research in this area easier, due to us having a well established tool for measuring this important phenomenon. As our research knowledge progresses we are often able to refine our understanding of psychological therapy, which can lead to better treatments for patients in the future.

♦Will my participation in the study be kept confidential?♦

The information you provide will be kept **strictly confidential**. You will not be personally identified in any of the study results or reports. The only person with direct access to your information will be the study researcher and her supervisors. All of the information held by the researcher will be held on a protected database.

Please note: You may wish to provide your name and address if you wish to receive a written summary of the results of this research. Your contact details will remain strictly confidential and will not be made known to anyone outwith the research team.

♦What will happen to the results of the study?♦

The results will be included in a doctoral thesis submitted to the University of Edinburgh by the study researcher. You will not be identified in this, or in any other report resulting from the study. A brief summary of the results will be made available to all those who participated in the study, if requested. You will not be identified in this summary.

♦Who else knows about the study? ♦

The study has been reviewed by NHS Grampian Research Ethics Committee, and by the University of Edinburgh Doctorate in Clinical Psychology Programme Team.

♦What should I do now? ♦

If you wish to take part: Please complete the enclosed questionnaires (within one month) and return this in the stamped addressed envelope.

If you do not wish to take part: We would like to thank you for taking the time to read through this information sheet. You need do nothing more. Your decision not to take part is completely respected.

♦Who can I contact? ♦

If you have been affected by anything in the questionnaire then please feel free to contact the Study Researcher on the telephone number given below.

If you have any queries about any aspect of the study or require further information, again, please do not hesitate to contact us at the address given below:

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APPENDIX 13 *Cognitive Fusion Questionnaire – 28 Items*

F-28

Below you will find a list of statements. Please rate how true each statement is for you by circling a number next to it. Use the scale below to make your choice.

1	2	3	4	5	6	7
never true	very seldom true	seldom true	sometimes true	frequently true	almost always true	always true

1. My thoughts cause me distress or emotional pain	1	2	3	4	5	6	7
2. I tell myself that I shouldn't be thinking the way I'm thinking	1	2	3	4	5	6	7
3. Even when I am having distressing thoughts, I know that they may become less important eventually	1	2	3	4	5	6	7
4. I find myself preoccupied with the future or the past	1	2	3	4	5	6	7
5. I make judgements about whether my thoughts are good or bad	1	2	3	4	5	6	7
6. Even when I'm having upsetting thoughts, I can see that those thoughts may not be literally true	1	2	3	4	5	6	7
7. I get upset with myself for having certain thoughts	1	2	3	4	5	6	7
8. I feel like my thoughts need to change before I can have a good life	1	2	3	4	5	6	7
9. I find it easy to view my thoughts from a different perspective	1	2	3	4	5	6	7
10. I tend to get very entangled in my thoughts	1	2	3	4	5	6	7
11. I think some of my thoughts are bad or inappropriate	1	2	3	4	5	6	7
12. I feel upset when I have negative thoughts about myself	1	2	3	4	5	6	7
13. I get very focussed on distressing thoughts	1	2	3	4	5	6	7
14. It's such a struggle to let go of upsetting thoughts even when I know that letting go would be helpful	1	2	3	4	5	6	7
15. My thoughts distract me from what I'm actually doing	1	2	3	4	5	6	7
16. I get so caught up in my thoughts that I am unable to do the things that I most want to do	1	2	3	4	5	6	7
17. I over-analyse situations to the point where it's unhelpful to me	1	2	3	4	5	6	7
18. I can watch my thoughts from a distance without getting caught up in them	1	2	3	4	5	6	7
19. It is OK to have inconsistent thoughts on the same subject	1	2	3	4	5	6	7
20. Its possible for me to have negative thoughts about myself and still know that I am an OK person	1	2	3	4	5	6	7

Please turn over

1	2	3	4	5	6	7
never true	very seldom true	seldom true	sometimes true	frequently true	almost always true	always true

21. I am able to do what's important in my life even when I have upsetting thoughts	1	2	3	4	5	6	7
22. I struggle with my thoughts	1	2	3	4	5	6	7
23. I can do difficult things even if my thoughts say they are impossible to do	1	2	3	4	5	6	7
24. I can be aware of my thoughts without necessarily reacting to them	1	2	3	4	5	6	7
25. Once I've thought about something upsetting its difficult for me to focus on anything else	1	2	3	4	5	6	7
26. I need to control the thoughts that come into my head	1	2	3	4	5	6	7
27. I tend to react very strongly to my thoughts	1	2	3	4	5	6	7
28. I get so caught up in my thoughts that I forget what I'm actually doing	1	2	3	4	5	6	7

Thank you for completing this questionnaire

APPENDIX 14 *Cognitive Fusion Questionnaire – 15 Items*

F-15

Below you will find a list of statements. Please rate how true each statement is for you by circling a number next to it. Use the scale below to make your choice.

1	2	3	4	5	6	7
never true	very seldom true	seldom true	sometimes true	frequently true	almost always true	always true

1.	My thoughts cause me distress or emotional pain	1	2	3	4	5	6	7
2.	I tell myself that I shouldn't be thinking the way I'm thinking	1	2	3	4	5	6	7
3.	Even when I am having distressing thoughts, I know that they may become less important eventually	1	2	3	4	5	6	7
4.	I get upset with myself for having certain thoughts	1	2	3	4	5	6	7
5.	I feel like my thoughts need to change before I can have a good life	1	2	3	4	5	6	7
6.	I tend to get very entangled in my thoughts	1	2	3	4	5	6	7
7.	I find it easy to view my thoughts from a different perspective	1	2	3	4	5	6	7
8.	I get very focussed on distressing thoughts	1	2	3	4	5	6	7
9.	It's such a struggle to let go of upsetting thoughts even when I know that letting go would be helpful	1	2	3	4	5	6	7
10.	I over-analyse situations to the point where it's unhelpful to me	1	2	3	4	5	6	7
11.	It is OK to have inconsistent thoughts on the same subject	1	2	3	4	5	6	7
12.	Once I've thought about something upsetting its difficult for me to focus on anything else	1	2	3	4	5	6	7
13.	I need to control the thoughts that come into my head	1	2	3	4	5	6	7
14.	I tend to react very strongly to my thoughts	1	2	3	4	5	6	7
15.	Its possible for me to have negative thoughts about myself and still know that I am an OK person	1	2	3	4	5	6	7

Thank you for completing this questionnaire