Test-Retest Reliability and Further Validity of the Cognitive Fusion Questionnaire

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ABSTRACT

Introduction

Acceptance and Commitment Therapy (ACT) has developed from traditional behavioural theory and seeks to reduce experiential avoidance and increase psychological flexibility. It is argued to be distinct from cognitive therapy and has been used to treat a variety of mental health problems in addition to chronic pain. ACT is linked to Relational Frame Theory and the research developments associated with this. One central process of ACT is termed 'cognitive defusion' and this process is used to encourage individuals to become less identified with the content of their cognitions. It is important to measure the extent to which individuals become 'fused' with their cognitions and a Cognitive Fusion Questionnaire (CFQ) has been developed to do this. The current studies build upon earlier research by subjecting the CFQ to further reliability and validity testing and assessment of its factor structure.

Method

A community sample was used throughout. The majority of participants took part online, however, some participants completed paper copies of the questionnaires. Study one had a sample of 47 and focused on construct validity of the CFQ where participants completed this measure and also measures of similar and distinct constructs. The other measures included a mindfulness questionnaire, a measure of experiential avoidance and a social desirability questionnaire. Study two concerned the test-retest reliability of the CFQ. There were 82 participants in this study who completed the CFQ on two occasions, one month apart. In this study, participants also completed a measure of anxiety and depression symptoms. Study three had 144 participants and assessed the factor structure of the CFQ.

Results

Results from study one indicate that the CFQ negatively correlates with a measure of mindfulness and positively correlates with a measure of experiential avoidance. This

study also found that the CFQ has no relationship with a measure of conscious attempts to appear more desirable. Results from study two show that there is a strong positive correlation between scores on the CFQ at testing time one and testing time two. The CFQ was also found to correlate positively with a measure of anxiety and depression symptoms and to mediate the relationship between anxiety scores at testing time one and testing time two. Confirmatory factor analysis was used in study three to assess the factor structure of the CFQ and found a two factor model was the best fit for the data.

Discussion

The results are considered in relation to relevant research. Limitations of the current studies are assessed and possibilities for future research discussed. In particular, cognitive fusion is discussed in relation to anxiety and depression symptoms. The similarities between the CFQ and a measure of experiential avoidance are discussed and the different aspects of measurement are reflected upon.

1 INTRODUCTION

1.1 Introduction to Acceptance & Commitment Therapy

Acceptance and Commitment Therapy (ACT) is described by its developers (Hayes *et al.,* 2006, p.2) as one of the "third generation" of behaviour therapies. It has been proposed that ACT has followed from traditional behavioural theory which aimed to measure behaviour which is directly observable (Cullen, 2008). Cognitive therapy expanded upon traditional behaviour theory to include a cognitive element which could not previously be accounted for (Beck, 1970). Hayes (2005) has suggested that ACT has developed from this and is a fundamentally new model. ACT is proposed to provide an understanding of human behaviour and mental health problems and it is linked to Relational Frame Theory (RFT), a "theory of human language and cognition" developed from behaviour analysis (Hayes *et al.,* 2006, p.5). In the following paragraphs these concepts will be considered further to understand the position of the ACT model within the behavioural theory tradition.

The proposal that ACT is a totally new therapy and is part of a third movement of behaviour therapy is not without its critics. Other researchers consider ACT as an extension of the cognitive therapies, in particular Cognitive Behavioural Therapy (CBT) and while they may accept that ACT brings something new, have suggested that it is not sufficiently revolutionary to mark the beginning of a new behavioural movement or to replace CBT (Hofman & Asmundson, 2008). ACT is not the only therapy believed to constitute this proposed third wave (Fletcher & Hayes, 2005). Other interventions such as Dialectical Behaviour Therapy (DBT; Linehan, 1993), Mindfulness Based Cognitive Therapy (MBCT; Segal *et al.,* 2002) and Mindfulness Based Stress Reduction (MBSR; Kabat-Zinn, 1990) are also considered by Hayes *et al.* (2006) as part of the third movement of behavioural therapies. Hofman and Asmundson (2008) have argued, however, that the developers of these other therapies do not consider themselves to be part of this movement. The suggested uniqueness of ACT and how it compares to cognitive therapies will be returned to later in more detail.

In order to provide an understanding of ACT it is necessary to give some description of this model. Key to ACT is the concept of psychological flexibility which is described by Hayes *et al.* (2006) as "the process of contacting the present moment fully as a conscious human being and persisting or changing behaviour in the service of chosen values" (p.9). The theory of ACT has advised that individuals' flexibility in this respect can be reduced by their attempts to avoid unpleasant inner events. It has been suggested that Western society generally understands uncomfortable feelings, thoughts and sensations as abnormal and something to be removed (Harris, 2006). Thus anxious feelings, negative thoughts and a racing heart for example, are experiences to be avoided. ACT terms this avoidance of uncomfortable inner events as "experiential avoidance" (Hayes *et al.,* 1999, p.58). ACT suggests that engagement in experiential avoidance reduces an individual's psychological flexibility as it limits the responses they have in relation to such events and drives behaviour in a particular direction (Fletcher & Hayes, 2005). Another contributor to psychological inflexibility is "cognitive fusion" (Hayes *et al.,* 1999, p.72). Cognitive fusion is described as the degree to which an individual becomes caught up in the content of their thoughts. This results in the individual to some extent identifying with their thoughts and they are unable to take a more objective stance which would allow them to consider their thoughts as an inner experience rather than statements of fact (Eifert *et al.,* 2009).

The main objective of ACT, therefore, is to increase psychological flexibility. There are six interrelated processes which the ACT model describes as ways of achieving this (Lundgren *et al.*, 2008). The first principle of the ACT model is acceptance, whereby the individual is encouraged to accept the presence of uncomfortable inner events such as anxious feelings and negative thoughts (Yovel, 2009). This helps prevent avoidance of these events. The second principle is termed "cognitive defusion" (Hayes *et al.,* 2006, p.8) and is described as a process which "change[s] the way one interacts with or relates to thoughts by creating contexts in which their unhelpful functions are diminished". In this context, individuals are encouraged to see their thoughts as purely thoughts and not accurate representations of reality (Cullen, 2008). Cognitive fusion

and defusion will be considered in more detail below. It is highlighted by Cullen (2008) that acceptance and cognitive defusion are similar to behavioural exposure in the respect that they increase exposure to the uncomfortable inner events and often reduce their severity over time, although this is not a specific goal of ACT.

ACT also encourages the individual to make contact with the present moment in order that they experience events directly rather than via the cognitions which the situation activates. This is established through the use of mindfulness techniques (Harris, 2006). Another ACT principle promotes experiencing the "self as a context" (Hayes *et al.,* 2006, p.9) where the individual experiences their 'self' as the background in which all inner events are experienced. This facilitates a detachment between the individual self and their inner experiences so that the individual becomes less identified with these experiences. The fifth principle of ACT concerns the identification of values that the individual wishes to live by in order that these can guide their behaviour. The final principle of ACT is committed action which encourages the individual to act in ways which are in line with their values, despite the presence of distressing inner events (Yovel, 2009).

The ACT model perceives these six principles as either being processes of mindfulness and acceptance or processes of behavioural change (Hayes *et al.,* 2006) and different strategies are employed by each principle to encourage psychological flexibility. The emphasis on these principles of the ACT model enables ACT to be seen as "principles-driven rather than procedure-driven" (Wilson & Roberts, 2002, p.237). The principles are not seen as entirely separate, rather they are linked and merge into each other and it is highlighted by Hayes (2005) that each principle has an individual influence in addition to a collective one. This does, however, make it difficult to measure these principles and identify the degree to which each may be involved in therapeutic change.

As briefly referred to above, it is not the goal of ACT to remove the symptoms of mental health problems or unpleasant inner events, however, this often happens as a side effect

(Wilson & Roberts, 2002). In these circumstances, individuals still experience negative inner events but do not become involved with them or identify with them. In therapy, individuals are encouraged to identify the ways in which they try to avoid or control their inner events, whether these attempts have reduced their 'symptoms' over time and whether they are nearer to their goals as a result of this activity (Harris, 2006). This process of helping individuals to be aware that their attempts to control their inner events actually exacerbate them is known as "creative hopelessness" (Ciarrochi & Robb, 2005, p.118). In this respect, individuals are able to consider the way they relate to their inner events and the energy they are investing in their attempts to control them.

Harris (2006) emphasised that ACT can be used in a variety of settings with individuals or with groups, may treat a range of difficulties (both physical and psychological) and can be used as either a short or long term therapy. There is flexibility within ACT as to how it is administered. Indeed, ACT therapists are encouraged to develop their own strategies of implementing the six main processes of ACT (Hayes *et al.,* 1999). There is recognition within ACT of individual variability which gives therapists and patients the flexibility to adapt ACT techniques whilst still remaining within the ACT framework (Hayes *et al.,* 1999). While the flexibility in approach is likely to be helpful when treating individuals, it may make it more difficult to measure ACT scientifically.

It would seem that this flexibility could result in uncertainty regarding which aspects of ACT are helping if therapists are not all doing the same thing. One study has helped highlight the flexibility of ACT in targeting different population groups (Brown & Hooper, 2009). In this study, the authors used ACT to treat an individual with a learning disability who was experiencing "anxious and obsessive thoughts and rumination" (Brown & Hooper, 2009, p.197). The participant had a full scale IQ of 44 which is classified as moderate to severe learning disability, thus a cognitive approach is argued to have been inappropriate (Brown & Hooper, 2009). Defusion techniques and a measure of acceptance and avoidance were adapted for the participant. For example, abstract concepts (such as letting thoughts go) were made concrete by involving the

participant in an activity of writing their thoughts on leaves and then letting the leaves float down a river (Brown & Hooper, 2009). The participant reported a reduction in experiential avoidance following the intervention which was corroborated by parental report and maintained at four month follow up.

Brown and Hooper (2009) emphasised that greater adaptations in psychological therapy are required for individuals with learning disabilities and acknowledged that their study only included one participant. In addition to this, CBT had not been attempted with this individual so it is unknown if this would also have helped (Brown & Hooper, 2009). Although ACT encourages flexibility of approach and allows therapists to make adaptations, it is unclear whether these adaptations mean that the therapy then works in the same way. This seems to contradict the emphasis of ACT researchers on the need for a scientific background to therapy. Psychological therapies must be flexible to respond to individual variability, however, it then becomes more difficult to identify the ways in which they are operating.

1.2 Theory of ACT

Another unique aspect of ACT is understood to be its link with Relational Frame Theory (RFT) and the research developments related to this (Blackledge, 2007). RFT is a behaviour analytic theory of language and cognition (Hayes *et al.,* 2006) and from this perspective, cognition is understood to be ruled by verbal processes. It is suggested by this theory that humans learn to "derive" relations between stimuli even where such relations have not been "directly taught" or reinforced (Blackledge, 2003, p.425). This process then becomes automatic and is triggered by contextual cues. Many researchers have illustrated this by giving the example that when an individual learns that A is equivalent to B and B is equivalent to C, they naturally derive that A must also be equivalent to C (Barnes-Holmes, Barnes-Holmes, Smeets, *et al.,* 2004). In addition to this it is proposed by RFT that such derived relations between stimuli are "bidirectional" (Stewart & Barnes-Holmes, 2004). That is, if A is equal to B then B is equal to A. This is particularly relevant in the case of language, where, for example, it is learned that if

the word ‘dog’ represents a particular four legged furry creature then this creature is also equivalent to the word ‘dog’ (Cullen, 2008). This demonstrates how language begins to assume the actual properties of what it represents. This process is believed to be unique to humans (Barnes-Holmes, Barnes-Holmes, McHugh *et al.,* 2004). It is also understood to explain the occurrence of experiential avoidance. From this perspective, Barnes-Holmes, Barnes Holmes, McHugh *et al.* (2004) state that “the bidirectional relations between the words and the events allow the report to acquire many of the aversive and painful functions of the trauma itself” (p.360). Individuals are, therefore, more likely to avoid any thoughts, feelings or other inner events in the present moment which are associated with the trauma, despite the trauma itself not being in the here and now.

RFT has also proposed that in some cases, stimuli are related based on their physically observable properties. In other cases, however, the relations are more “arbitrary” so that individuals learn that a pound coin is bigger in value in relation to a 50 pence coin despite the fact that it is smaller in physical size (Barnes-Holmes, Barnes-Holmes, McHugh *et al*., 2004). This again illustrates the role of language in this process – the concept of ‘bigger’ in terms of value cannot be directly observed, it is a descriptive term of an arbitrary concept. In addition to this, RFT emphasises the role of context whereby derived relations are only made when certain contextual cues are present (Blackledge, 2003). A child learns, for example, that a dog is bigger than a mouse but smaller than an elephant. In one context, the dog is ‘bigger’ (in the presence of a mouse). Alternatively, the dog is ‘smaller’ in a different context (when next to an elephant). This highlights the role that context plays and Hayes *et al.* (1999) have emphasised the importance of functional contextualism within ACT. In relation to ACT, functional contextualism refers to the significance of context in producing inner events and ACT has suggested that context and function of such events should be the focus of change rather than the events themselves (Hayes *et al.,* 1999). Following from this, another important aspect of RFT is referred to as “transformation of stimulus function” (Hayes & Wilson, 2004, p.224). This refers to the change in functions of one stimulus due to its relationship with another stimulus. This process is again believed to be influenced by context. Stewart

and Barnes-Holmes (2004) have illustrated this process by way of the use of analogy in ACT. They describe the case where an individual in therapy is guided to consider their experiences with anxiety as being similar to being caught up in quicksand. Due to the provision of verbal information (the analogy), the individual then attributes some of the functions of quicksand to anxiety (Stewart & Barnes-Holmes, 2004).

Hofman and Asmundson (2008) proposed that this approach considers mental events (which are dominated by language) to become emotionally charged as a result of the context they occur in. Difficulties occur when the individual tries to avoid, control or analyse such events rather than simply allowing them to take place and experience them for what they are. To illustrate this further, learning based on verbal processes is argued to play a role in the development of mental health difficulties (Hayes *et al.,* 2006). For example, a child may always have played happily with dogs. On being told, however, that dogs can bite, the child then relates 'dog' with the experience of being bitten and thus gets anxious around dogs, subsequently changing their behaviour in relation to them. Despite never having been bitten by a dog, the function of the stimulus 'dog' has changed for the child due to the provision of verbal information about dogs and the child now relates 'dog' to a negative experience. This highlights how learning can occur outside direct experience and can instead be due to verbal processes. Indeed, Hayes *et al.* (1999) have suggested that learning through direct experience is more open to change, whereas learning due to verbal rules is much more difficult to influence. In this case and consistent with traditional behaviour theory, avoidance is reinforced by an immediate reduction in anxiety. The child thus avoids the dog due to the relations it has derived between dogs and a negative outcome (thoughts of being bitten). This again demonstrates transformation of stimulus function.

From this perspective, it is believed that language can distort reality as individuals become fused with the language in their thoughts rather than their direct experience (Blackledge, 2007). This can be seen in the example from above where the child no longer approaches dogs based on what they have been told about dogs regardless of the

fact that their direct experience of dogs has not been unpleasant. Cognitive fusion is understood to describe how individuals become caught up in their mental activities (that is, thoughts). Blackledge (2007) has described this by stating that indirect experience is produced by "verbal processes" (p.565). In other words, how an individual experiences events is influenced by the language produced in such events.

Hayes and Shenk (2004) suggested that therapeutic strategies should develop from theory which has been guided by research in order that the processes producing clinical change can be studied and understood. This allows the identification of whether new strategies impact upon the psychological processes they are believed to and whether this produces change. Hayes *et al.* (1987) stated that it is not helpful simply to show that therapy works, but the process by which it works must also be identified. This illustrates why therapy must be based upon theory. Hayes *et al.* (2006) have argued that this process is made possible in ACT due to its links to RFT. Where psychological strategies do not develop from scientific study, Hayes and Shenk (2004) have suggested they develop from "clinical intuition, accidental variation or mere common sense" (p.249). As ACT is linked to RFT, Hayes (2005) has argued that it provides an understanding of "basic behavioural principles, to processes of change, to applied technology, to empirical studies of clinical outcome" (p.133).

Hayes (2008) has suggested that criticisms of ACT can occur due to a lack of understanding of both this therapy and RFT and it is understandable that this could happen given the very technical nature of RFT and the obtuse language it uses. Blackledge (2003) has stated that "RFT intentionally makes use of technical, non-colloquial language to allow a scientific treatment of cognition" (p.421). While this may be so, it runs the risk of alienation. While it may be advantageous that ACT is linked to a body of research within RFT, RFT itself is not easily understood or accessible. Indeed, when Hofman and Asmundson (2008) attempted to explain RFT, they stated that "in order to avoid possible misinterpretation or oversimplification of the approach we will frequently cite the sources directly" (p.5). The current author also experienced this

problem. Therein lies a significant difficulty for the ACT/RFT approach, that is it is not easily explained or approached. In order for ACT to be more widely embraced it may have to adjust its own language when describing RFT in order to facilitate understanding.

1.3 Cognitive Fusion & RFT

Following from the discussion on RFT above, it is believed that language and verbal processes are infused in the daily life of humans (Hayes & Wilson, 2003). This can be useful in many ways, however, it can also cause difficulty. RFT and the role of language in human behaviour is particularly relevant to cognitive fusion. As mentioned, cognitive fusion is believed to be involved in the persistence of mental health problems and one of the main principles of ACT is cognitive defusion (Yovel, 2009). These concepts will now be considered in greater detail.

As discussed above, human language is bidirectional which results in words assuming the same functional properties as the stimuli they represent (Soriano *et al.,* 2004). Eifert *et al.* (2009) described cognitive fusion as "the tendency of human beings to get caught up in the content of what they are thinking" (p.373). This occurs to the extent that individuals become fused with their thoughts, so that their thoughts are part of their identity and taken as factually correct (Greco *et al.,* 2008). Individuals are then compelled to respond to the content of thoughts because their thoughts have become part of them. Soriano *et al.* (2004) have suggested that when cognitive fusion occurs, the events to be avoided are moved from a context of "there" to "here and now" (p.389). That is, the use of language which permeates cognitions, allows for previously occurring negative events to be experienced in the present moment as the uncomfortable thoughts, sensations and feelings related to the event are equated with the individual self. This demonstrates why individuals often choose to engage in experiential avoidance – avoidance results in an immediate (but short term) reduction in negative inner experiences.

To illustrate cognitive fusion, Masuda *et al.* (2010) have used the example of an individual who has the thought "I am depressed" (p.11). When fusion occurs, it follows that the individual identifies with this thought so that the self is equated with the word 'depressed'. Cognitive fusion thus occurs when following a thought, the individual experiences the cognitive and emotional response that would take place were the thought to be literally true. Greco *et al.* (2008) suggested that this results from an "attachment" (p.93) of the individual to the content of their inner events. If distressing inner events are perceived to be true, individuals try to avoid and control them, thus resulting in experiential avoidance. In terms of RFT, cognitive fusion is understood to be influenced by context (Blackledge, 2007). Thus, in a context which promotes cognitive fusion, an individual is likely to engage in behaviours which help them avoid the experience of certain inner events (Greco *et al.,* 2008). Hayes *et al.* (2006) described how a "context of literality" (p.7) promotes fusion whereby words are taken as being one and the same as what they are referring to.

Further to this, individuals use words to describe themselves and therefore the individual 'self' becomes fused with language (Hayes *et al.,* 1999). This discussion highlights the relational nature of language and cognition and how this allows individuals to discuss and consider things which are not actually present (Hayes & Wilson, 2003). This again illustrates the "bidirectional" function of language whereby symbols are used to represent stimuli (Hayes & Wilson, 2003, p.162). Hayes *et al.* (2004) suggested that the bidirectional nature of language increases the amount of situations which are avoided as language enables the experience of inner events to occur in any situation.

Hayes and Wilson (2003) also emphasised that language is frequently "evaluative" (p.162), thereby allowing individuals to categorise and make comparisons. Inner events are classified as 'good' or 'bad'. It is human nature to try to make sense of things in this way and establish relations between things (Ciarrochi *et al*., 2005). However, the individual then tries to encourage the 'good' experiences while minimising the 'bad'. This also promotes experiential avoidance as discussed above. Hayes and Wilson

(2003) suggested that evaluation is important for survival as it allows the individual to seek out environments that are considered 'good', for example, where there is wide availability of food. Language is thus important for problem solving (Hayes & Shenk, 2004). In relation to inner events, however, the judgemental nature of language drives experiential avoidance. The fact that individuals can often follow what they have learned from verbal rules rather than their direct experience is also problematic (Ciarrochi *et al.,* 2005). Verbal rules are learned from an early age, therefore they are rigid and difficult to change (Hayes *et al.,* 1999).

To sum up cognitive fusion, Hayes and Shenk (2004) have stated that "the 'mind', that organised repertoire of verbal relations, creates an alternative universe of derived stimulus functions, never quite in the present because it is always 'about' something. It rarely is what it is" (p.252). This further illustrates how cognitive fusion can remove the individual from direct experience.

1.4 Cognitive Defusion

As discussed above, one of the main processes of the ACT model is cognitive defusion. Blackledge (2007) stated that "defusion occurs when language use conventions are violated to the point that specific words or phrases lose their ability to make these words' abstract referents psychologically present and appear to exert control over subsequent behaviour" (p.562). In addition to this and following from the above, Soriano *et al.* (2004) have suggested that defusion occurs when the individual who is experiencing the uncomfortable inner events can move these events from the "here" to "there" (p.389). This allows the individual to be aware of the experience of these events but not to identify with the properties of them. One way in which to do this (and promoted by ACT) is to observe the process of thought so that the individual notices that they are having certain thoughts without getting fused with the content of them (Blackledge, 2007). This reduces the literality of thought (thus changing the context) and encourages the individual to be more objective about their thoughts. They can also name their thoughts and emotions or use mindfulness techniques to achieve cognitive

defusion (Blackledge, 2007). Interfering with the usual rules of language also produces defusion, for example, by repeating the same word continuously, talking at a different rate and pitch or singing words rather than saying them (Blackledge, 2007).

Cognitive defusion is different to other cognitive strategies as it does not attempt to alter the content of cognitions (Blackledge, 2007). Rather it aims to change the function and context of these cognitions. It does this through interrupting the verbal processes which attribute and alter the functions of cognitions so that words no longer produce the mental images and emotions associated with them (Blackledge, 2007). This results in a change in the relationship an individual has with their inner events (Eifert *et al.,* 2009). For example, being aware of the process of thought creates a different context to focusing on the content of thoughts (Hayes *et al.,* 1999). This change of context allows the individual to adopt a more distanced and objective stance to their thoughts instead of becoming involved with them or identifying with them (Blackledge, 2007). By being aware of the process of thought, the individual has a greater range of responses available to them. This contrasts with responses which are limited by focusing purely on the content of thought (Hayes *et al.,* 1999). For example, an individual may think 'I am anxious in this place, I've got to get out of here' and therefore have the urge to leave the situation they are in. Alternatively, if the individual thinks 'I am having the thought that I must get out of here', this highlights to them that whilst they may feel anxious and have the urge to leave, they do not necessarily need to act on the thought 'I've got to get out of here'. This is believed to increase flexibility of response (Hayes & Shenk, 2004). Considering the process of thought expands the individual's awareness so they see more to the thought than purely its content.

Cognitive defusion is also believed to facilitate the operation of the other ACT principles (Fletcher & Hayes, 2005). It enables acceptance of inner events as these events are no longer seen as factual. It also encourages contact with the present moment as the individual is less caught up in their thoughts and more open to direct experience. By allowing the individual to separate from their thoughts, defusion also facilitates a sense

of self as context. It increases flexibility of response, thus allowing the individual to respond in a greater number of ways and in line with their chosen values (Fletcher & Hayes, 2005). Blackledge (2007) cautioned that cognitive defusion is not a state to be achieved. Instead, defusion can come and go. It is not an extreme and is not permanent.

1.5 Studies Considering Defusion

As discussed, ACT is believed to work partly through the process of defusion (Healy *et al.,* 2008). In order for this belief to be demonstrated, the process of defusion must be isolated from the other components of ACT to allow its measurement. Further to this, Masuda *et al.* (2004) stated that it is still unclear which defusion techniques are effective. In their study, Masuda *et al.* (2004) focussed on the specific defusion technique of repeating a single word continuously. They suggested that this removes the context which is needed to make the word meaningful. Masuda *et al.* (2004) found that this technique reduced the strength of belief and emotional response to negative self-generated statements in eight participants. This study used a very small student sample who were given incentives to participate and the outcome was measured by self-report.

Masuda *et al.* (2010) built upon the earlier study by comparing a cognitive defusion technique with thought distraction and a control condition and found that the defusion technique lowered distress and strength of belief in a negative self-related thought. Masuda *et al.* (2010) again used a student sample, however, they found the defusion technique worked for those with and without depressive symptoms. In this study, while the distraction technique was found to be less effective than defusion, it was still more effective than the control condition. Masuda *et al.* (2010) suggested that this may indicate that defusion and distraction are not as distinct as ACT proposes. They also found variability within each group after the interventions and suggested that the techniques may vary in their impact upon different people. The outcome in this study was also measured by self-report and no follow up was carried out to consider whether the changes were maintained.

A similar study was carried out by Healy *et al.* (2008), however, they used a different defusion strategy whereby individuals read negative statements about themselves preceded by the words "I'm having the thought that ….." (p.625). Consistent with expectations, it was found that this technique increased willingness to read the negative self-statements and reduced the emotional distress associated with them (Healy *et al.,* 2008). Unexpectedly, however, the extent to which the participants believed the statements was found to increase when using the defusion technique. Healy *et al.* (2008) suggested this may have been due to the manner in which the extent of the belief was measured – that is, it was measuring the whole statement, including the defusion phrase. In this sense, they argued, this result may actually support defusion. Further research will be required to see if this is actually the case. In addition to this, Healy *et al.* (2008) found that defusion had less impact upon positive self-statements and suggested that defusion may have greater influence on distressing mental contents as individuals are more likely to try to avoid them. This study also used a small student sample and depended on self-report measures.

Cognitive fusion and defusion have also been considered in relation to parenting and Coyne and Wilson (2004) presented a case study of a child whose behaviour was targeted by a behavioural intervention which incorporates defusion techniques. This further emphasises the extent to which cognitive fusion permeates every day life and the potentially wide applicability of this ACT technique (Coyne & Wilson, 2004). This study was limited, however, by its use of a single case study. In addition to this, the ACT intervention was combined with "parent-child interaction therapy" (Coyne & Wilson, 2004, p.481) which makes it difficult to identify which aspect of the intervention was beneficial.

Defusion techniques were also used as an aspect of treatment of a single case study of an Asian-Indian immigrant in North America who was experiencing anxiety, low mood and difficulties adapting to the culture (Murrell *et al.,* 2009). In this case, the individual was able to imagine her negative thoughts as an object, although the defusion strategy was

only part of the overall ACT intervention. This was a correlational study and it is uncertain exactly which aspects of the intervention were most helpful. Murrell *et al.* (2009) advise the use of more controlled studies to examine this.

A study by Forman, Hoffman *et al.* (2007) considered the use of an acceptance approach which included defusion strategies to manage cravings for food. Both this approach and a control approach were found to help participants manage their cravings. It was further found that those who had lower levels of craving benefitted most from the control strategies, while those who had higher levels of craving responded best with the acceptance approach although this difference was not significant. Forman, Hoffman *et al.* (2007) thus suggested that individuals who are trying to lose weight but experience strong cravings for food are most likely to be helped by using an acceptance approach. This study used student participants and dieting status was not considered. Thus it is not possible to generalise the results to a real life setting (Forman, Hoffman *et al.,* 2007). In addition to this, defusion strategies were used alongside the acceptance strategies and therefore, it is unclear which of these techniques contributed to the result.

1.6 Defusion & Related Concepts

As mentioned above, some of the ACT principles are considered to be mindfulness and acceptance processes. ACT thus employs mindfulness as a way to get in touch with inner events and consider how they are influencing behaviour and whether this is consistent with chosen values (Harris, 2006). Mindfulness is generally understood as the ability to be in the present moment without judging it. Awareness of the utility of mindfulness in treating psychological difficulties has increased recently so that other therapies and interventions in addition to ACT also employ it as a treatment strategy (Carmody & Baer, 2007). ACT and DBT are understood to use shorter mindfulness tasks, while MBCT and MBSR advise more lengthy engagement in this practice (Baer *et al.,* 2006).

Defusion allows individuals to separate from their thoughts and adopt a more objective stance towards them (Yovel, 2009). This type of definition is similar to some definitions of mindfulness which is also partly understood as the ability to distance oneself from inner events in order to be in touch with the present moment more fully (Dekeyser *et al.,* 2008). Due to the similarity between these two concepts, it could be speculated that they are not fully distinct. Brown and Ryan (2003) suggested that mindfulness helps individuals be aware of their automatic thoughts and behavioural responses and to separate from them. It helps individuals consider their behaviour in terms of their needs and alter it accordingly. This sounds very similar to defusion and the goals of ACT. Indeed, ACT uses mindfulness techniques as part of its intervention to reduce cognitive fusion, for example, the use of meditation to create a context where the usual verbal processes cannot function (Hayes & Shenk, 2004). Further to this, Hayes and Shenk (2004) described defusion as "a mindfulness technique" (p.253) while mindfulness and defusion are believed to be absent when an individual is caught up in their thoughts (Brown & Ryan, 2003).

Scientific research of mindfulness is itself at an early stage (Hayes & Wilson, 2003), thus although the process of how mindfulness is believed to work can be stated, this needs to be corroborated with scientific study. Indeed, uncertainty still exists around the exact definition of mindfulness (Brown & Ryan, 2004). Brown and Ryan (2004) stated that in order to be able to measure mindfulness, it must be clearly described, although they suggested that mindfulness is a form of consciousness which is itself not fully understood. In addition to this, Fletcher and Hayes (2005) emphasised that while mindfulness may not appear to be scientific, scientific processes are needed to describe and measure it. This apparent contradiction may result in difficulties in measuring mindfulness. These uncertainties around mindfulness could similarly be applied to cognitive defusion, although due to its links with RFT, cognitive defusion may be perceived as more scientific.

Perhaps another distinction between defusion and mindfulness regards the literality of language (Hayes & Shenk, 2004). The defusion technique of repeating the same word over and over results in the removal of the word's literal meaning. This can detach the individual from language. Therefore, it can be seen that defusion uses a variety of techniques, not just mindfulness ones. Following from this, it may perhaps be correct to state that defusion enables mindfulness, as it provides a context for a mindful way of being, rather than defusion and mindfulness being the same concept (Fletcher & Hayes, 2005).

A similar argument may be applied to the apparent similarities between cognitive fusion and "believability" of thoughts (Healy *et al.,* 2008, p.625). If an individual has little belief in their thoughts, they are less likely to engage in experiential avoidance and their thoughts are less likely to drive their behaviour. Thus it could be argued that believability and cognitive fusion refer to the same concept and defusion occurs when the individual has less belief in their thoughts. In the study by Healy *et al.* (2008), the authors stated that they made no attempt to define defusion or how it operates, rather they aimed to consider how defusion techniques work. Healy *et al.* (2008) thus indicated that defusion has yet to be fully defined by research. It still remains unclear whether cognitive fusion and believability are distinct, however, it could be argued that fusion refers to more than belief in one's thoughts. Fusion is understood to refer also to how the individual identifies with their thoughts and gets caught up in them (Hayes *et al.,* 1999).

Healy *et al.* (2008) proposed that believability has to reduce in order for defusion to occur suggesting that lowered believability facilitates defusion and that one of the outcomes of defusion is a reduction in believability. This is supported by Bach and Hayes (2002) and Fletcher and Hayes (2005) who both suggested that cognitive defusion results in lowered believability. As will be discussed below, both Bach and Hayes (2002) and Gaudiano and Herbert (2006) reported a reduction in believability in psychotic symptoms after ACT interventions. In order to measure fusion and defusion it

would appear to be important to distinguish between them and believability. Healy *et al.* (2008) proposed that a change in believability suggests that defusion has occurred, however, they further stated that "the process of defusion itself remains obscure" (p.638). In addition to this, they suggested that defusion can be measured by "assessing concurrent changes in discomfort, believability and willingness" (p.638). However, this indicates that defusion itself is not being measured.

Perhaps defusion can be distinguished from reduction in believability by the way in which it impacts upon this. Defusion techniques aim to "change the functions of private experiences" (Fletcher & Hayes 2005, p.319) thus it is more than a change in believability. RFT explains how this occurs as discussed above and perhaps the focus on the function of thoughts in addition to the inclusion of RFT allows for defusion to be distinguished from reductions in believability.

A final concept which appears similar to defusion is decentring. Decentring is described by Fresco, Segal *et al.* (2007) as "the capacity to take a present-focused, non-judgemental stance in regard to thoughts and feelings and to accept them" (p.448). Further to this, decentring is understood to allow individuals to observe their inner events without getting caught up in them (Teasdale *et al.,* 2002). The similarity in these descriptions of decentring in comparison to cognitive defusion is startling and seems greater than any similarity defusion may share with mindfulness or believability. Further to this, Teasdale (1999) distinguished between "metacognitive knowledge" which is considered to be the experience of "thoughts as thoughts" and "metacognitive awareness" (p.147), where the process of thought is experienced. Decentring is believed to increase metacognitive awareness. Again this highlights the similarity between defusion and decentring and Teasdale (1999) emphasised that ACT was initially described as "comprehensive distancing" (p.153). It is understood that the inability to decentre increases the risk of experiencing mental health problems again similar to the vulnerability posed in this respect by cognitive fusion.

Mindfulness Based Cognitive Therapy (MBCT) was developed by Segal *et al.* (2002) to target the recurring nature of depression and one of the main tools of this approach is decentring. Similarities between MBCT and ACT may again be apparent as MBCT aims to weaken the links that occur between low mood and the unhelpful thinking processes and behaviours that occur when an individual is depressed (Teasdale *et al.,* 2000). It does this through adopting a decentred approach which lowers experiential avoidance of inner events and allows the individual to consciously consider their behavioural responses. This could be interpreted as a change in stimulus function and increased flexibility of response as encouraged by ACT and discussed above. MBCT also encourages individuals to accept their inner events rather than try to change them (Fresco, Segal *et al.,* 2007). MBCT is most effective for individuals who have experienced at least three episodes of depression and it is believed that this is due to repeated episodes strengthening the links between low mood and unhelpful thinking processes (Ma & Teasdale, 2004).

Teasdale *et al.* (2000) stated that one of the aims of MBCT is to encourage individuals to take a decentred approach towards the thoughts and feelings that are associated with their depression. Perhaps this is a distinction between decentring and defusion, as defusion can be applied to any thoughts and feelings, not just those that are undesirable. However, although decentring may be targeted at inner events associated with depression, it does not necessarily follow that it cannot be used with other thoughts and feelings. In addition to this and as mentioned above, Healy *et al.* (2008) found that a defusion technique had less influence upon positive self-statements as opposed to negative, suggesting that defusion is more effective with negative mental contents. Fresco, Moore *et al.* (2007) suggested that decentring was an aspect of CBT prior to the utilisation of mindfulness by many other approaches and they further stated that mindfulness is not equivalent to decentring. Further clarity is required regarding the distinctions (if any) between decentring and cognitive defusion.

1.7 ACT for Mental Health Problems

Following from the above discussions on cognitive fusion and experiential avoidance, psychological difficulties can be understood to involve these processes (Hayes & Wilson, 2003). For example, the language used by individuals on a daily basis can result in the experience of uncomfortable inner events (Hayes *et al.,* 2006). Attempts to avoid these distressing inner experiences, such as fearful thoughts, can actually perpetuate these as illustrated above (Hofman & Asmundson, 2008). The individual can then become caught up in this process, potentially exacerbating the experience of mental health problems.

Avoidance is particularly common in individuals experiencing anxiety (Eifert *et al.,* 2009). Individuals attempt to avoid their anxious thoughts and feelings and this often results in avoidance of situations which trigger anxiety. Individuals then experience a short term reduction in anxiety symptoms but they persist long term. Eifert *et al.* (2009) suggested that ACT allows individuals to consider the effects of trying to control their anxiety and how it can be counter-productive. Individuals are then taught to sit with their anxiety, allow it to happen and consider it more objectively and mindfully. They are encouraged to commit to behavioural change which is consistent with their values, despite the presence of their anxious symptoms. The use of traditional behavioural strategies within ACT such as exposure, gives the individual the opportunity to experience their anxiety and change the way they respond to it (Eifert *et al.,* 2009). Indeed, Hayes and Duckworth (2006) stated that exposure is advised by ACT not to reduce symptoms but to increase the individual's range of responses to their symptoms. It is unclear, however, whether the benefits brought about by exposure are due to a reduction in symptoms or increased flexibility of response. Eifert *et al.* (2009) reported three single case studies using ACT to treat various anxiety disorders. All participants described a reduction in anxiety symptoms, although this is not an aim of ACT. Two of the participants also felt more in control of their anxiety, although again, this is not the purpose of ACT, rather it occurs as a side effect (Eifert *et al.,* 2009). This study used self-reports to measure outcome and the individual cases were drawn from a larger

study. The individual cases reported were chosen by each individual's therapist which may have resulted in a positive bias.

As discussed, ACT does not seek to increase control over inner events or to reduce their frequency or intensity (Hayes *et al.,* 1999). It is acknowledged, however, that this may occur through the process of ACT as a side effect. Arch and Craske (2008) have speculated whether acceptance would continue to be so effective if such a "by product" (p.269) did not occur and they emphasised that further research is required to investigate this. In addition to this, they suggested that predictability of inner events results from familiarity with them and the contexts in which they occur. As the individual becomes more aware of the process of their thinking through ACT techniques, it is likely that they will become better able to predict the occurrence of their inner events (Arch & Craske, 2008). Again, predictability of inner events is not a specified goal of ACT (Fletcher & Hayes, 2005).

The fact that ACT does not seek symptom change makes its therapeutic impact difficult to measure (Arch & Craske, 2008). Indeed, it is unclear how outcome can be measured in ACT. An individual can report that they are living more mindfully, that they are more accepting of their inner events and they have a more valued life, but it is unclear how this can be measured objectively. It appears that outcome is likely to vary between individuals as different people have different values and different perceptions of what a valued life is. Arch and Craske (2008) have speculated whether symptom reduction is inherently involved in a more valued life. They proposed two possible relationships between a reduction in anxiety symptoms and a valued life. It is possible that a reduction in anxiety symptoms may result in behavioural change that is more consistent with an individual's values (Arch & Craske, 2008). Alternatively, it is possible that behavioural change consistent with one's values (for example, less avoidance) results in a reduction of anxiety. It is unclear whether these relationships exist and Arch and Craske (2008) highlighted the possibility that one relationship occurs in ACT and another within CBT. Again, further research is required to explore this.

The utility of ACT in treating psychosis has been considered by Bach and Hayes (2002). These authors suggested that individuals suffering from psychosis may also try to suppress and avoid their symptoms, resulting inadvertently in an increase of these experiences. In this study, all patients were given treatment as usual, however, one group was provided with ACT in addition to this. Bach and Hayes (2002) found that the rehospitalisation rate was reduced by fifty per cent for those who received the ACT intervention during the four months following treatment. Both groups reported similar levels of frequency of symptoms and upset caused by these symptoms. However, the patients receiving ACT reported less belief in their symptoms. These positive results were not maintained, however, which the researchers suggested was due to the short length of the ACT intervention (four sessions) (Bach and Hayes, 2002). They also found that ACT did not have a positive outcome for the patients who were delusional and denied their symptoms. This study is also limited by the use of self-reports and the presence of co-morbid diagnoses and substance misuse. Bach and Hayes (2002) highlighted that the participants in their study were more likely to be individuals suffering from chronic psychosis who had experienced previous episodes of hospitalisation.

In a later study by Gaudiano and Herbert (2006) involving in-patients suffering from various psychiatric disorders, ACT was found to be superior to "enhanced" (p.418) treatment as usual in some areas of functioning. Fewer patients who had received ACT were re-admitted to hospital in the four months following the study, although the researchers noted that this did not reach significance (Gaudiano & Herbert, 2006). Interestingly, although both the experimental and control groups reported a reduction in frequency of hallucinations following each intervention, the group receiving ACT reported they were less troubled by their hallucinations and were significantly less likely to believe their hallucinations (Gaudiano & Herbert, 2006). Consistent with an ACT approach, Gaudiano and Herbert (2006) suggested that strength of belief in hallucinations should be the target of interventions, rather than the frequency by which hallucinations occur and this is also supported by the findings of Bach and Hayes (2002)

mentioned above. Gaudiano and Herbert (2006) cautioned, however, that their study had a small sample and some of their results just fell into the significance range. The majority of participants were African American males with little education. In addition to this, the study was not blind and participants had a range of psychiatric diagnoses as well as physical health and substance misuse problems (Gaudiano & Herbert, 2006). This may be a positive aspect of the study, however, as it is likely to reflect typical in-patient settings (Gaudiano & Herbert, 2006).

ACT has not only been used to treat mental health problems but has also been found to help individuals manage physical pain (Páez-Blarrina *et al.,* 2008). Several studies have been carried out considering the role of acceptance in managing chronic pain (McCracken *et al.,* 2007; McCracken & Zhao-O'Brien, 2010; McCracken & Eccleston, 2003). Some studies have also included a measure of activity related to values and how this is associated with pain (McCracken & Vowles, 2008). These studies have generally found that acceptance and valued activity is connected with better functioning in a variety of areas. However, samples in these studies tend to be less ethnically diverse, have greater amounts of women and tend to involve participants who are actively seeking treatment. In addition to this, these studies are mostly correlational and used self-report measures. A study by Vowles *et al.* (2008) carried out a mediational analysis on the role of acceptance in relation to catastrophic thinking and chronic pain. This study found that acceptance partially mediated the relationship between this form of dysfunctional thinking and levels of "depression, pain-related fear and disability" (Vowles *et al.*, 2008, p.S140). Acceptance was found to be positively related with improved functioning. It was not, however, found to mediate the relationship between catastrophic thinking and severity of pain.

Two studies assessed the impact of an ACT intervention on functioning in individuals with chronic pain (McCracken *et al.,* 2005; Vowles & McCracken, 2008). Both studies found improvements in functioning following intervention. Participants were not randomised to treatment condition, however, and further studies may benefit from this.

McCracken *et al.* (2005) acknowledged this but also emphasised that the "naturalistic" (p.1344) approach they took allows the results to be generalised to everyday clinic settings. In addition to this, McCracken *et al.* (2005) stated that participants in their study were on a waiting list prior to intervention which allowed a comparison in functioning prior to and following treatment. A further study by Páez-Blarrina *et al.* (2008) found that despite reporting similar levels of pain to a control group, individuals taught to use ACT were more likely to persist with a task which produced pain. They suggested that this indicates "low believability of high pain" in the individuals using the ACT strategies (Páez-Blarrina *et al.,* 2008, p.95). This study was limited by a small student sample; however, it did assign participants randomly to experimental conditions and used both objective and subjective measures of outcome. Similar to the approach with mental health problems, ACT encourages acceptance of symptoms in individuals suffering from chronic pain and aims to reduce the extent to which individuals are fused with their pain related thoughts while increasing value related activity (Hayes & Duckworth, 2006). Using a single case experimental design, Twohig *et al.* (2006) also found four out of five individuals who engaged in skin picking reduced this behaviour to almost zero after an ACT intervention. However, only one participant out of four who returned for follow up maintained their progress. No control condition was used in this study.

The use of ACT for couples has been considered by Peterson *et al.* (2009). Both couples in this study reported increased marital satisfaction following an ACT intervention. "Interpersonal distress and overall psychological distress" were reported to have reduced (Peterson *et al.,* 2009, p. 439). Peterson *et al.* (2009) suggested that defusion and acceptance helped the participants to be more aware of the unhelpful behaviours they engaged in towards their partners and helped them consider alternative behavioural responses. Smaller changes than expected were found in terms of "mindfulness, thought suppression and acceptance" (Peterson *et al.,* 2009, p. 439) and the authors suggested this may have been due to the absence of mental health problems experienced by the participants involved in the study. No controls were used in this study and outcome was

again measured by self-report. In addition to this, Peterson *et al.* (2009) acknowledged that they did not measure how well therapists adhered to the treatment procedures.

A study by Petersen and Zettle (2009) considered the ability of ACT to treat individuals who had co-morbid depression and alcohol misuse. They suggested that these conditions can often co-occur and speculated that both may be the product of experiential avoidance, thus ACT was expected to be particularly effective in treating these conditions. This study found that both ACT and treatment as usual had similar outcomes in reducing depression, however, Petersen and Zettle (2009) emphasised that both groups remained in treatment until they could be discharged. Those who received the ACT intervention were able to be discharged at an earlier date and required less individual therapy. Follow up of participants after discharge was not possible. In addition to this, the sample size was small and consisted of individuals who were "involuntarily committed" to a substance misuse treatment centre which may have biased the results (Petersen & Zettle, 2009, p.524).

ACT has also been found to be helpful in treating depression, OCD, substance misuse, social anxiety, PTSD, agoraphobia (Callaghan *et al.,* 2004; Pull, 2008), epilepsy (Lundgren *et al.*, 2008) and trichotillomania (Woods *et al.,* 2006) while Masuda *et al.* (2007) found that ACT reduced the strength of stigmatising beliefs about mental health problems held by their participants. In contrast, educating participants on mental health problems was not found to have a significant effect on the participants who were psychologically inflexible. This study was limited, however by its use of a student sample who were given incentives to participate. Outcome was measured by self report and Masuda *et al.* (2007) acknowledged that no conclusions could be drawn about which aspect of the intervention was producing the change.

1.8 Methodological Concerns Regarding ACT Studies

It has been emphasised by Öst (2008) that ACT studies have methodological limitations. Öst (2008) suggested that relatively few randomised controlled trials considering ACT

have been carried out. In addition to this, Öst (2008) found in his meta-analysis that only half of all the ACT studies included used participants with a specific diagnosis. Öst (2008) highlighted that studies in CBT and DBT frequently use participants with a specific diagnosis and cautioned that ACT studies are not as methodologically strong as studies in CBT in this respect. Following from this, Gaudiano (2009) agreed with Öst (2008) that studies of ACT need to improve, however, Gaudiano stated that this has been proposed by ACT researchers themselves. Gaudiano (2009) reported that it is difficult to match ACT and CBT studies as they use different populations who have different difficulties and of varying severity. Gaudiano (2009) was critical of Öst's (2008) own methodology and it should be noted that Öst (2008) developed his own measure of "methodological stringency" (p.313) in his study. It is concluded by Gaudiano (2009) that ACT research is following a natural process and will mature with time.

A later meta-analysis of ACT studies was carried out by Powers *et al.* (2009). This meta-analysis involved studies which treated a variety of disorders (both physical and psychological) and used various outcome measures. Powers *et al.* (2009) found that overall ACT was superior to control conditions at both end of treatment and follow up, although the control conditions tended to be treatment as usual. They did not find that ACT had a significantly greater effect than a waiting list control condition for treating anxiety and depression. Further to this, both overall and in relation to anxiety and depression, ACT was not significantly superior to other well known treatments such as CBT and cognitive therapy (Powers *et al.,* 2009). Powers *et al.* (2009) emphasised that the lack of a significant difference between treatments is not an uncommon finding and this is not unique to ACT.

Pull (2008) suggested that more studies with a higher level of control and larger sample size are required. In the above meta-analysis, Powers *et al.* (2009) found that ACT studies tend to use treatment as usual control conditions and suggested that more studies need to be carried out comparing ACT with other treatments. Studies focusing on specific diagnoses are also encouraged by Powers *et al.* (2009). It is still unclear exactly

how ACT works (Powers *et al.,* 2009) while Forman, Herbert *et al.* (2007) highlighted that research into ACT tends to be carried out by its supporters which may bias results. Despite these limitations, Powers *et al.* (2009) recognised that ACT research is still at an early stage and suggested that initial results are promising and warrant further study.

To try and address some of these concerns, Forman, Herbert *et al.* (2007) carried out a study to compare ACT with cognitive therapy (CT) for patients with symptoms of anxiety and depression (Forman, Herbert *et al.,* 2007). Trainee therapists with little or no ACT and CT experience were used to provide the therapy in this study in order to control for "allegiance effects" (Forman, Herbert *et al.,* 2007, p.778). These therapists also administered both therapies in this study. Forman, Herbert *et al.* (2007) found no difference in outcome between the two treatments. Both groups were found to have significant improvement with large effect sizes. Forman, Herbert *et al.* (2007) suggested that these results indicate that ACT is as effective as CT. They found that different mechanisms were at work in each therapy, consistent with the underlying theories, although emphasised that this aspect of the study was correlational. Eighty per cent of the sample were women and no waiting list control group was used. As the therapists administered both therapies, Forman, Herbert *et al.* (2007) stated that there was an "overlap in therapeutic technique" (p.793) between conditions which perhaps may explain why each treatment was equally effective.

In a study of chronic pain, Vowles *et al.* (2009) compared the outcome of an ACT intervention with that of CBT. Both treatments were found to have a positive impact upon functioning, however, the ACT approach produced better results on "measures of depression and pain-related anxiety" (p.55). Contrary to expectations, levels of acceptance increased with both the ACT and CBT interventions which may suggest that a focus on acceptance is common to both these approaches. It is important to note that this study was not randomised and that participants were free to persist with other treatments in which they were involved in addition to the experimental interventions. ACT was also compared with CBT by Hernádez-López *et al.* (2009) for its effectiveness

in aiding smoking cessation. These researchers found that ACT was both "feasible" and "acceptable" to participants in a similar manner to CBT (Hernádez-López *et al.,* 2009, p.728). Those participating in the ACT intervention were also more likely to have maintained their progress at 12 month follow up compared to CBT. This study had a fairly small sample size however, and participants were not randomised to treatment condition.

A comparison of ACT with systematic desensitisation for maths anxiety was carried out by Zettle (2003). This study found both interventions significantly lowered maths anxiety and this was maintained at follow up. Zettle (2003) found, however, that although both interventions alleviated state anxiety, only systematic desensitisation significantly lowered trait anxiety. It was further found that ACT produced the most positive change in individuals who engaged most in experiential avoidance (Zettle, 2003). This study used a small, mainly female sample of students and self-report measures. Participants were, however, randomly assigned to the treatment conditions.

1.9 ACT compared to CBT and Further Criticisms of ACT

This naturally leads to a discussion on the potential similarities and differences between CBT and ACT. As mentioned above, ACT has been compared most with CBT and the development of ACT is in part due to what the ACT developers see as potential limitations of CBT (Hayes, 2008). CBT has been found to be useful for treating a variety of problems and difficulties and it is supported by research (Forman, Herbert *et al.,* 2007; Arch & Craske, 2008). It has been found to be better than waiting list controls and some other active treatments. Indeed, Forman, Herbert *et al.* (2007) stated that cognitive therapy "is widely considered the current gold-standard psychotherapeutic approach, particularly for mood and anxiety disorders" (p.773). However, while cognitive therapy has been found to alleviate a variety of psychological disorders, it is still unclear how it does this (Longmore & Worrell, 2007). Although it is believed that change occurs during cognitive therapy due to changes in cognitions, this has yet to be established and indeed, has not been supported by research (Dimidjian, 2006; Longmore

& Worrell, 2007). Hayes (2005) has suggested that CBT does not possess "an adequate basic account of cognition itself" (p.133). This has led to further developments within the cognitive-behavioural field and resulted in the proposed third wave therapies. As RFT provides an explanation of human language and cognition in behavioural terms it is believed that it is able to contribute understanding to human behaviour in general and to all forms of psychopathology (Hayes, 2005). It is argued that the link between ACT and RFT enables the processes of ACT to be connected to theory and allows for the manner in which these processes are believed to operate to be tested scientifically (Hayes and Shenk, 2004).

While some researchers may focus more on the differences between ACT and CBT, Hofman and Asmundson (2008) suggested that ACT builds upon CBT and uses some of the same techniques. They also stated that CBT may use acceptance strategies. From this perspective, ACT is not a new therapy and it does not, Hofman and Asmundson (2008) have argued, take the place of CBT. Indeed, Forman, Herbert *et al.* (2007) highlighted that both therapies have a "grounding in empiricism and the emphasis on an active, collaborative, therapeutic relationship" (p.775). The similarities between ACT and CBT have also been considered by Vowles *et al.* (2009) who emphasised their shared focus for lowering distress and improving daily functioning. In addition to this, both therapies have stemmed from the behavioural tradition (Vowles *et al.,* 2009). Hofman and Asmundson (2008) emphasised that ACT is still relatively new and research into it is still at an early stage, whereas CBT has been much more widely researched. It may, therefore, be unfair to compare them (Gaudiano, 2009).

Hofman and Asmundson (2008) suggested that comparisons between these two treatments are often the result of a lack of understanding of CBT and have described the ways in which CBT is often misunderstood. Instead, they proposed that ACT and CBT can be distinguished by their focus, where "CBT techniques are primarily antecedent-emotion focused, whereas ACT and other mindfulness approaches are primarily response-focused" (Hofman & Asmundson, 2008, p.2). That is, CBT considers the

trigger that produces the distressing emotion while ACT focuses on how the individual responds to distressing mental contents. This may seem a rather simplistic way of viewing ACT. In a further illustration of this, Masuda *et al.* (2004) highlighted that CBT focuses on negative thoughts and how these produce negative emotions, physical symptoms and unhelpful behaviours. CBT techniques aim to alter the content or strength of negative cognitions. Conversely, ACT focuses on the way an individual relates to their thoughts and aims to increase their awareness of this process. ACT is not the only therapy which has this focus; DBT and MBCT also work towards this (Masuda *et al.,* 2004). Ciarrochi and Robb (2005) suggest that the philosophies underlying CBT and ACT are quite distinct. From this perspective, CBT is believed to use a more "mechanistic" method, looking at cause and effect of mental health difficulties within the individual (Ciarrochi *et al.,* 2005, p.81). While undergoing CBT, individuals are encouraged to test out hypotheses that they hold about themselves, others and the world to see if these are accurate interpretations of reality (Hofman & Asmundson, 2008). Conversely, the philosophy of ACT focuses on the function of difficulties within their context to understand why they occur and does not attempt to change inner events (Gillanders, in press). This is supported by Vowles *et al.* (2009) who suggested that CBT focuses more on symptom reduction than ACT and CBT appears to imply that this must occur prior to behavioural change.

One form of therapy within the CBT tradition, Rational and Emotional Behavioural Therapy (REBT) has been considered in detail in relation to ACT (Ellis, 2005). Ellis (2005) suggested that like ACT, REBT also attends to language and how it influences cognition. REBT is also proposed to promote acceptance of self, others and life in general and also encourages commitment to therapy, values and goals (Ellis, 2005). As mentioned, one of the main differences between ACT and CBT is that ACT does not focus on the content of cognitions as it is believed that this encourages fusion with thoughts (Hayes *et al.,* 1999). It has been argued by Ellis (2005), however, that the process of therapy itself indirectly targets the content of cognitions. Ellis (2005) suggested that a positive therapeutic relationship enables the individual to realise that the

therapist accepts them, thus this itself may challenge the content of their self-beliefs, for example, 'I am worthless'. Through the non-judgemental contact the individual has with their therapist, the content of this thought (and others like it) may be challenged, albeit indirectly (Ellis, 2005). Ellis (2005) does agree, however, that ACT is unique in terms of its research into language and cognition. Ellis (2005) appears to have argued that REBT includes ACT techniques, however, in addition to this, REBT encourages thought challenging. In support of this, Ciarrochi and Robb (2005) suggested that while ACT involves acceptance, REBT involves both "acceptance and change" (p.123). Ciarrochi *et al.* (2005) stated that REBT aims to challenge unhelpful beliefs as these can often be related to avoidance. In their study, Ciarrochi *et al.* (2005) found that measures of ACT and REBT were positively related, which they suggested indicates these are similar constructs.

Consistent with this, Ciarrochi and Robb (2005) proposed that cognitive reframing may help the individual become aware of their thoughts and the impact their thoughts have on their behaviour, a process which, they argued, is consistent with ACT. Ciarrochi and Robb (2005) suggested that cognitive reframing does not necessarily result in increased fusion as ACT researchers have proposed. This is supported by Arch and Craske (2008) who suggested that cognitive challenging is not the same as thought suppression and challenging can result in less severe symptoms. Arch and Craske (2008) have also advised that challenging encourages the individual to focus on thoughts which were previously avoided. In addition to this, a study by Westin *et al.* (2008) found that acceptance of tinnitus symptoms did not result in a significant difference in performance on an imagery task compared to participants asked to suppress thoughts related to their symptoms. This suggests that thought suppression may not always have negative results (Westin *et al.,* 2008).

Similarly, Ciarrochi and Robb (2005) highlighted that ACT does not state that cognitive challenging should never be carried out and suggested that the reasons as to why ACT does not encourage challenging need to be investigated. They proposed that like ACT,

REBT provides a context whereby individuals can become aware that their thoughts are not literally true, although REBT achieves this through cognitive challenging (Ciarrochi & Robb, 2005). The ability to see that thoughts are not literally true results in distancing from cognitions which is, Arch and Craske (2008) have argued, a form of cognitive defusion. Through cognitive challenging, REBT reduces the impact that thoughts can have upon behaviour which again appears consistent with the general theory of ACT. Further to this, Fresco, Segal *et al.* (2007) found that depressed individuals undergoing CBT achieved greater levels of decentring than those treated with anti-depressant medication while Ciarrochi and Robb (2005) stated that content and context of cognitions are linked and that by considering the content of their thoughts, individuals are more aware of what they are avoiding. Changing the content of thoughts may also change the context so that individuals no longer see their thoughts as literally true (Ciarrochi & Robb, 2005).

While Hayes (2005) has agreed that REBT is the form of CBT that ACT is most consistent with, he resisted suggestions that ACT is merely an extension to the CBT approach and proposed that ACT is "fundamentally different from much of what has gone before in the behavioural and cognitive therapies" (p.132). Hayes (2005) suggested that CBT is largely a theory of cognition not language, whereas ACT incorporates both of these. Hayes (2005) further suggested that the links between CBT and cognitive theory have not been supported. From the many studies carried out on CBT, it is clear that it is effective in alleviating distress, however, it has yet to be demonstrated how CBT operates (Hayes, 2005). In support of this, McCracken *et al.* (2005) stated that CBT is known to be effective for treating chronic pain, however, the specific "treatment components" (p.1344) that produce the positive results have not been established. Arch and Craske (2008) also emphasised that although many studies have been carried out regarding CBT, very few have considered how CBT works "using formal mediational analyses" (p.273). Hayes (2005) has suggested that RFT provides an understanding as to how ACT processes work and this has been demonstrated through research.

Ciarrochi *et al*. (2005) and Ciarrochi and Robb (2005) have advised that REBT and ACT can be integrated as above. However, they suggested that some change has to occur within REBT to accomplish this. It is proposed by Hayes (2005) that the fact REBT has to change to incorporate ACT indicates that ACT is bringing something new. Further to this, Hayes (2005) has agreed that beliefs can often be unhelpful but suggested that it does not then simply follow that the most helpful approach is to challenge or change the beliefs. Hayes (2005) suggested that cognitive challenging keeps the thought active and may reinforce it and the function it serves. In addition to this, ACT techniques can be applied to all inner events and not just cognitions (Hayes 2005).

Longmore and Worrell (2007) have reviewed the evidence for cognitive challenging and found that while cognitive therapy can be effective, it is no more effective than behavioural interventions. Adding a cognitive component to a behavioural treatment has not been found to have a greater effect on outcome (Longmore & Worrell, 2007). Indeed, Dimidjian *et al.* (2006) found that a behavioural activation intervention was superior to cognitive therapy for individuals with more severe levels of depression. In this study, behavioural activation was found to produce similar results to antidepressant medication (Dimidjian *et al.*, 2006). Longmore and Worrell (2007) have also suggested that no causal link has been found between cognitive techniques and changes in cognitions. In response to these studies, Arch and Craske (2008) have proposed that cognitive challenging may be a type of exposure which may explain why CBT and behavioural interventions have similar outcomes. Jarrett *et al.* (2007) found in their study that "changes in negative cognitive content were accounted for by changes in depressive symptoms rather than vice versa" (p.443). This may indicate that there is a relationship between cognition and mood but it is yet to be fully understood and it may not operate in the manner which cognitive therapists believe. It has also been suggested by Hayes (2005) that therapeutic change occurs prior to the use of cognitive techniques, although Longmore and Worrell (2007) found no evidence to support this.

Given that CBT precedes ACT, has been widely researched and has been the treatment of choice for a significant time period, it is only natural that comparisons are drawn between them. When describing ACT, researchers often do so by comparing how it is different to CBT and identifying potential weaknesses of CBT. This may at times result in a competitive air between CBT and ACT followers. It is impossible to escape the inevitable comparisons, however, it would be unfortunate if this did not amount to more than a clamour for the position of most effective intervention. Indeed, Hayes (2008) stated that identifying weaknesses in one therapy does not then mean another therapy which does not have these weaknesses is better. Hayes (2008) emphasised the need for each therapy to develop independently of others.

As referred to above and from an alternative viewpoint, it is suggested by Arch and Craske (2008) that commonalities between therapies need to be considered as this helps to identify how each therapy is operating and will also allow for behavioural therapies to progress in general. They proposed that while on a superficial level, CBT and ACT appear quite different, they may share similarities at a more fundamental level. Similar to some of the arguments above, Arch and Craske (2008) highlighted that both CBT and ACT encourage individuals to take on a more "objective" (p.265) approach to their inner events although they may do this in different ways. Both techniques also provide the individual with skills and tools to manage their inner events. This is emphasised by Hofman and Asmundson (2008) who describe both CBT and ACT as "problem focused" (p.11).

From the perspective of functional analytic psychotherapy, Callaghan *et al.* (2004) suggested that ACT places little significance on an individual's relationships. Callaghan *et al.* (2004) stated that "ACT focuses specifically on the emotional experience of the client with less consideration of the interpersonal context in which the feeling occurs" (p.201). It is highlighted by Callaghan *et al.* (2004) that an inability to accept their emotions may occur due to an individual's experience of relationships where the expression of emotion was not tolerated. Callaghan *et al.* (2004) have promoted a more

interpersonal approach where the therapeutic relationship is used as the vehicle for change. Through this approach, therapists are encouraged to respond to patients' behaviour as it happens in session and use behavioural principles to encourage helpful behaviour and reduce dysfunctional behaviour.

While ACT helps reduce experiential avoidance, Callaghan *et al.* (2004) suggested that it does not help with the development of social relationships. It is emphasised by Callaghan *et al.* (2004) that although ACT considers the verbal nature of human beings, humans are also inherently social which seems to be given less importance by ACT. Indeed, Callaghan *et al.* (2004) have drawn attention to the fact that inner events "occur in the context of other people" (p.202). It could be argued, however, that the consideration of functional contextualism within ACT includes a focus on interpersonal relationships as Hayes *et al.* (2006) have stated that "contextualism views psychological events as ongoing actions of the whole organism interacting in and with historically and situationally defined contexts" (p.4). It is possible that context includes the social relationships an individual is engaged in.

Baruch *et al.* (2009) have also emphasised the importance of the therapeutic relationship in ACT. The therapist facilitates the patient in reducing experiential avoidance and cognitive fusion by helping them to change the context of inner events. Baruch *et al.* (2009) suggested that while this work results in ACT having a more "intrapersonal" focus, the outcomes are frequently "interpersonal" (p.243). ACT allows individuals to consider the values by which they wish to live their lives – it is possible and indeed likely, that individuals may include elements of social relationships within their values (Hayes *et al.*, 1999). This is illustrated by Baruch *et al.* (2009) who stated that "ACT does not encourage acceptance of hallucinations or delusions for its own sake, but such acceptance is encouraged in order for the client to act according to a value, such as asking a woman to dinner, reconnecting with one's family and so forth" (p.243). The fact that the study carried out by Petersen *et al.* (2009) considered an ACT intervention for couples also suggests that ACT takes account of relationships.

As discussed above, ACT and RFT have identified the problematic nature of language in increasing and maintaining experiential avoidance. Despite this, Arch and Craske (2008) highlighted the paradox that language is required for defusion and acceptance. The methods that ACT uses will require "self-talk in the form of verbal coaching" (Arch & Craske, 2008, p. 267). These authors continued to suggest that a focus on defusing thoughts that are inconsistent with values still results in the use of language categorisation and a focus on thought content which ACT seeks to avoid. Hayes *et al.* (1999) have emphasised that defusion can be used for all thoughts not just those which are inconsistent with values. They have also proposed that language itself and the ways in which it is used are not necessarily negative, rather that the reliance on verbal means to solve problems and the use of control strategies to alleviate unpleasant feelings are unlikely to allow the individual to change their behaviour in line with their values (Hayes *et al.,* 1999). Indeed, Hayes *et al.* (1999) suggested that the ACT model itself is to be "held lightly" (p.281) in order that individuals do not become caught up in the verbal aspects of it.

1.10 Development of a Cognitive Fusion Measure

Following from the above discussions, it is as yet unclear exactly how ACT operates. The theory behind it goes some way to explaining this, however, theory must be validated by research (Hayes *et al.,* 1987). In order for the process of ACT to be clearer and to identify the contribution that each component makes during treatment, it must be possible to measure each aspect individually (Hayes, 2008; Arch & Craske, 2008). Indeed, Peterson *et al.* (2009) stated that "future efforts to develop a scale to measure cognitive defusion seems increasingly important given the powerful nature and central focus of this construct" (p.439). The isolation of defusion would also allow consideration of how it relates to thought challenging and whether these two processes are similar (Arch & Craske, 2008). In addition to this, it would allow for defusion to be compared with mindfulness, believability and decentring as discussed above. It would also allow a more objective measure of ACT interventions and help identify the processes of change in this model. Towards this end, a measure of cognitive fusion has

been initially developed and validated as part of a thesis project at the University of Edinburgh (Dempster, 2009). Known as the Cognitive Fusion Questionnaire (CFQ), this measure is a 13 item questionnaire. Development of the CFQ is still at an early stage and it is unclear whether it is a reliable measure. One aspect of reliability concerns whether a measure yields the same results consistently over time, known as test re-test reliability (Barker *et al.,* 2002). Test-retest reliability minimises the amount of error reported in test scores as it is expected that scores will remain constant over a short period of time. Whether the CFQ can demonstrate test-retest reliability is still unknown.

Following from this, it is hoped that the CFQ will eventually be able to be used within a clinical population to measure change during and after psychological intervention (Dempster, 2009). This will enable cognitive fusion to be isolated and allow it to be measured. If the CFQ were unreliable, it would not be able to do this or consider whether a relationship exists between change in cognitive fusion and change in symptoms and behaviour after psychological intervention (Barker *et al.,* 2002). Hesser (2009) has encouraged more research to consider the extent to which individuals engage in acceptance and cognitive defusion prior to psychological intervention in addition to the presence of these behaviours in session. Barker *et al.* (2002) stated that test-retest reliability "is the most appropriate type of reliability when you are considering change over time" (p.61), however, they cautioned that very high reliability is not desirable as this would suggest that the measure is not sensitive to genuine change. Indeed, in developing the Acceptance and Action Questionnaire (AAQ), Hayes *et al.* (2004) found it had test-retest reliability of r = .64 across a four month period. Hayes *et al.* (2004) suggested that if this form of reliability was very high, it would not be consistent with ACT's understanding of experiential avoidance which tends to vary. In the current study, it was decided that participants would be invited to complete the CFQ on two occasions, one month apart, in order to provide a measure of test-retest reliability.

Reliability does not, however, establish whether a measure is valid (Barker *et al.,* 2002) and there are various forms of validity. Haynes *et al.* (1995) described validity as "the

degree to which elements of an assessment instrument are relevant to and representative of the targeted construct for a particular assessment purpose" (p.238). In terms of the CFQ, the targeted construct is cognitive fusion. For a measure to be valid it needs to correlate with other measures which assess similar constructs (convergent validity) (Barker *et al.,* 2002). Related to this, Fletcher and Hayes (2005) stated that mindfulness has a long history and has been incorporated into a variety of therapies including ACT. As discussed above, mindfulness can be used as a technique to encourage cognitive defusion, allowing an individual to step back from their thoughts and view them more objectively (Hayes *et al.,* 2006). It would, therefore, seem likely that individuals who experienced less cognitive fusion will also experience greater levels of mindfulness.

A measure of cognitive fusion would thus be expected to correlate negatively with a measure of mindfulness. This has already been initially considered by Dempster (2009) who found that the CFQ correlated with the Southampton Mindfulness Questionnaire, a measure of "mindful awareness of distressing thoughts and images" (Chadwick *et al.*, 2008, p.451). This indicates that the CFQ has construct validity. Dempster (2009) cautioned, however, that the SMQ was developed to consider mindful responses to psychotic symptoms and it was also found to have a single factor structure (Chadwick *et al.*, 2008). Other researchers (Baer *et al.,* 2006) consider mindfulness to be "multifaceted" (p.42) and various measures have been developed to measure the various components of mindfulness. It was recommended by Dempster (2009) that the CFQ be measured in relation to one of these measures. The Five Facet Mindfulness Questionnaire (FFMQ) has been developed by Baer *et al.* (2006) and is a development from the Kentucky Inventory of Mindfulness Skills (KIMS) (Baer *et al.,* 2004). Considering how the CFQ relates to the FFMQ may further identify the relationship between defusion and mindfulness.

Dempster (2009) also found that the CFQ negatively correlated with a measure of life satisfaction. As discussed above, cognitive fusion is believed to play a role in the development and maintenance of mental health problems (Hayes *et al.,* 1999). It is

likely, therefore, that cognitive fusion will be related to symptoms of anxiety and depression. This could be tested by comparing scores on the CFQ against scores on a measure of anxiety and depression symptoms. One such measure is the Hospital Anxiety and Depression Scale (HADS) (Zigmond & Snaith, 1983). Following from this, several researchers have emphasised the importance of mediation analysis to identify the specific elements of therapy which are producing change (Arch & Craske, 2008; Lundgren *et al.*, 2008, Vowles *et al.*, 2008). Mediational analysis of the CFQ in relation to anxiety and depression scores over time would therefore be useful to identify whether cognitive fusion is involved in mental health symptoms. It was decided that in addition to completing the CFQ on two occasions, participants would be asked to fill in the HADS twice too. If cognitive fusion is involved in anxiety and depression, it would be expected that CFQ scores would influence the relationship between anxiety and depression scores at testing time one and testing time two.

Dempster (2009) also considered how the CFQ correlated with a measure of experiential avoidance, the Acceptance and Action Questionnaire, second version (AAQ-II) (Bond *et al.,* submitted). These two questionnaires were found by Dempster (2009) to have a strong positive correlation (r = .65). Given the strength of this relationship, further assessment would be useful as Dempster (2009) queried whether this may indicate too much "overlap" (p.127) between these measures.

Part of ensuring a questionnaire's validity means establishing that it is not influenced by the effects of social desirability (Leite & Beretvas, 2005) and this relates to discriminant validity (Barker *et al.,* 2002). One of the ways in which to identify whether a measure is immune to the effects of social desirability, is to compare it with a questionnaire which considers this concept. The Balanced Inventory of Desirable Responding (BIDR) (Paulhus, 1991) is one such questionnaire and it was developed in response to the finding that social desirability is not a single construct (Stöber *et al.,* 2002). It was decided to include this measure in the current study to consider whether the CFQ is influenced by social desirability.

The CFQ was initially developed as a 28 item questionnaire. Dempster (2009) carried out an exploratory factor analysis of the CFQ using a mixed student and community sample which found that it could be reduced to 15 items given the factor structure. A two factor structure was found which suggests that the CFQ is measuring cognitive fusion and defusion (Dempster, 2009). Breckler (1990) has emphasised that it is inadvisable to use the same sample for both exploratory and confirmatory factor analysis of a model, therefore, carrying out a confirmatory factor analysis with a new sample would be beneficial. Further meetings between the developers of the CFQ resulted in the CFQ being reduced to 13 items while still maintaining internal consistency (Gillanders, personal correspondence, 14 June 2010). Four of the question items are worded in the opposite direction to reduce response bias and are thus scored in reverse. Further analysis by the CFQ developers has also found that a two factor structure may have been in part due to method variance caused by the reversed direction of responding on some of the items (Gillanders, personal correspondence, 14 June 2010). From this, it was decided that the CFQ would be scored as a one factor measure of cognitive fusion. A confirmatory factor analysis would also benefit this research.

1.11 Utility of Questionnaires

The use of self-report questionnaires is much debated within the literature. Positive aspects of self-reports are that they allow access to an individual's inner world (Barker *et al.,* 2002). Cognitive fusion is not directly observable and the use of a self-report may provide some insight into an individual's internal experiences. Written questionnaires also allow the individual to complete them in their own time and aid confidentiality (Barker *et al.,* 2002). Questionnaires, therefore, can be useful and Greco *et al.* (2008) highlighted that they are "convenient and cost-effective" (p.94). They are also quick to use. Self-reports are not, however, fully objective. They can be open to the effects of social desirability (Barker *et al.,* 2002), although as discussed, this can be addressed by comparing them with measures of this construct.

Like cognitive fusion, mindfulness may also be a difficult construct to measure by self-report. Van Dam *et al.* (2009) considered the FFMQ and suggested that some items of this questionnaire "function differently" (p.516) for those who meditate compared to those who do not. They suggest that the FFMQ may not identify individuals who are more mindful, rather it may indicate those who are more aware that their attention has wandered. Van Dam *et al.* (2009) highlighted the difficulty that measures of mindfulness have when used with individuals who have less awareness and stated that "trying to re-represent an experience one was potentially unaware of in the first place likely increases error and bias" (p.516). Further to this, Van Dam *et al.* (2009) found that while individuals who meditated scored more highly on the FFMQ, those who did not meditate but had some knowledge of mindfulness also had higher scores than those without this knowledge. This suggests that an understanding of a construct may increase scores without individuals necessarily displaying higher levels of that construct. While this argument is directed towards mindfulness, it may equally apply to measures of cognitive fusion. As discussed above, cognitive fusion occurs when changes occur in the functions of thoughts in controlling behaviour. It is likely, however, that individuals will lack awareness of this process as it becomes largely automatic (Hayes *et al.,* 1999).

Wicksell *et al.* (2008) stated that "measuring ….. cognitive fusion with a self-report questionnaire is difficult and other types of assessment may be useful" (p.497). Related to this, Hayes *et al.* (2004) suggested that as experiential avoidance varies across settings it may be difficult to measure reliably and it could be argued that the same is true of cognitive fusion. Hayes *et al.* (2004) have stressed that the use of questionnaires to measure experiential avoidance is still questionable. They state that "the contextual behavioural nature of experiential avoidance and its multiple features do not fully fit psychometric assumptions" (Hayes *et al.,* 2004, p.572). This argument could also be applied to the use of a questionnaire to measure cognitive fusion which is also likely to fluctuate over time and will be influenced by the context an individual is in. Hayes *et al.* (2004) have stated, however, that questionnaires to measure experiential avoidance can be useful as they can guide further research and tool development and that a variety of

approaches may be required for assessment of this construct. Therefore, although a self-report questionnaire may not provide a full measure of cognitive fusion, it may still contribute some understanding of this construct.

1.12 Aims of the Current Study

The CFQ has been developed to isolate cognitive fusion from the ACT model and consider its unique contribution to psychological change. Before this measure can be used in this manner, it will be important to establish whether it is reliable and valid, whether it is influenced by social desirability and if it is distinct from other psychological concepts as discussed. The following aims were thus identified for the current study:

1. To consider whether the CFQ relates to a multi-faceted measure of mindfulness. It is hypothesised that the CFQ will correlate negatively with such a measure.

2. To establish whether the CFQ continues to positively correlate with the AAQ-II. It is hypothesised that the CFQ will positively correlate with this measure.

3. To establish whether the CFQ is influenced by social desirability. It is hypothesised that the CFQ will not correlate with a measure of social desirability.

4. To assess the test-retest reliability of the CFQ. It is hypothesised that the CFQ will demonstrate good reliability in this respect.

5. To consider how the CFQ relates to symptoms of anxiety and depression. It is hypothesised that the CFQ will correlate positively with a questionnaire measuring these symptoms. In addition to this, it is further hypothesised that CFQ scores will mediate the relationship between anxiety and depression symptoms at time one and time two.

6. To carry out a confirmatory factor analysis of the CFQ following from the exploratory factor analysis completed by Dempster (2009). It is hypothesised that the current study will find the same two factor structure as that found by Dempster (2009).

2 METHODOLOGY

2.1 Sample Size Calculations

Dempster (2009) found a large correlation (r = -.79) between the CFQ and a measure of mindfulness. A large correlation was also found by Dempster (2009) between the CFQ and the AAQ-II, a measure of experiential avoidance (r = .65). It was, therefore, expected in the current study that these moderate to large relationships between the CFQ and measures of mindfulness and experiential avoidance would persist. In addition to this, it was expected that the CFQ would correlate strongly between testing time one and two. Cohen (1992) advised that for the purpose of correlations, a sample of 28 is required where the effect size is expected to be large and a sample of 85 is required where the effect size is expected to be moderate. In the current studies, therefore, a sample size of 60 was aimed for to detect a moderate to large effect. The CFQ has not been measured in relation to social desirability, therefore, the existence of a relationship between cognitive fusion and social desirability and its size is unknown. A larger sample would thus be required to measure the CFQ in relation to a measure of social desirability. For the factor analysis, one perspective suggests that there is a requirement of 10 participants for each questionnaire item (Schreiber *et al.,* 2006). The CFQ has 13 items thus requiring a sample of 130 for a confirmatory factor analysis to be completed. There is uncertainty about the recommended number of participants for confirmatory factor analysis and other researchers have recommended a minimum of 200 (Marsh *et al.,* 1988). Shevlin and Miles (1998) have also suggested that whether sample size affects the results is influenced by the scale of the factor loadings and also whether the models have been defined or are "misspecified" (p.88).

2.2 Study One – Validity of the CFQ

Study one focussed on the validity of the CFQ.

2.2.1 Participants

There were 47 individuals in study one, 24 males and 23 females after one participant was excluded due to missing data (this will be discussed below). Male participants thus constituted 51 per cent of the sample while 49 per cent of the sample was female and 40 of these individuals had some form of further education. The ages of participants ranged from 21 to 73 and the mean age was 35 (SD = 11.54).

2.2.2 Exclusion Criteria

Participants were required to be adults (age 18 and over) whose first language was English. This would ensure that participants were fluent in reading English and thus able to comprehend the CFQ and other measures included. One participant was excluded due to missing responses on the CFQ. One participant was excluded from the analysis considering the relationship between the CFQ and the AAQ-II due to missing responses in the AAQ-II. One participant was also excluded from the correlational analysis between the CFQ and the BIDR due to missing responses in the BIDR. How missing data was handled will be discussed in greater detail below.

2.2.3 Measures

Study one used the following measures.

Demographic Questionnaire

Participants were requested to record their age, gender, and highest level of education. This was to ensure a good representation of the general population was achieved. Participants were also requested to provide their email address if they consented to participating on a second occasion for study two (details below). In addition to this, participants were informed that one of the questionnaires was a screening measure for symptoms of anxiety and depression but it was not a diagnostic measure (the Hospital

Anxiety and Depression Scale). Participants were asked to indicate by ticking a box if they wished to be informed if they scored highly on this measure. They were advised that they would be contacted after the second testing occasion.

Cognitive Fusion Questionnaire

The Cognitive Fusion Questionnaire (CFQ) is a 13 item questionnaire rated on a 7 point scale and measures cognitive fusion and defusion. Four of the CFQ items are worded in a way to minimise response bias and are reverse scored. It was initially developed by Dempster (2009) who advised that high scores on this measure denote cognitive fusion and reported internal consistency on this measure of 0.88. Dempster (2009) initially proposed 44 items to encompass cognitive fusion and these items were rated by an expert panel of ACT clinicians and researchers. Through exploratory factor analyses, the number of items was reduced to 15 by Dempster (2009) and then reduced to 13 as mentioned in the introduction section (Gillanders, personal correspondence, 14 June 2010). A two factor model was found by Dempster (2009) to be the best fit for this measure and Dempster (2009) obtained results supportive of the convergent validity of the CFQ. The CFQ can be seen in Appendix A

Hospital Anxiety and Depression Scale

The Hospital Anxiety and Depression Scale (HADS) is a 14 item multiple choice questionnaire which screens for symptoms of anxiety and depression but is not a diagnostic tool (Zigmond & Snaith, 1983). It was initially developed for use with patients hospitalised with physical health conditions, however, it is now often used to screen for anxiety and depression symptoms in the general population (Dunbar *et al.*, 2000). The HADS uses a self-report format, is quick and easy to use and is found to be "acceptable" to patients (Herrmann, 1997, p.18). In their literature review of studies assessing the HADS, Bjelland *et al.* (2002) reported that in general such studies support the ability of the HADS to identify clinical cases of anxiety and depression and it has adequate concurrent validity. Conversely, Dunbar *et al.* (2000) suggested that while some studies are supportive of the HADS ability to detect clinical cases, others indicate

the HADS may identify "too many false positives" (p.79). The HADS is also believed to have good internal consistency and test-retest reliability (Johnston *et al.,* 2000), however, there is still debate about the factor structure of the HADS (McCue *et al.,* 2006) and there is some variability of scores depending on gender (Nortvedt *et al.* 2006). The two subscales of the HADS have also been found to correlate with other measures of anxiety and depression (Herrmann, 1997). The HADS can be seen in Appendix B.

Five Facet Mindfulness Questionnaire

This is a multi-faceted measure of mindfulness developed by Baer *et al.* (2006) and consists of 39 items rated on a 5 point scale. Baer *et al.* (2006) developed this measure from an earlier measure of mindfulness, the Kentucky Inventory of Mindfulness Skills (KIMS) (Baer *et al.,* 2004). The KIMS had four components of mindfulness, however, when considering the KIMS with other measures of mindfulness, Baer *et al.* (2004) found through exploratory factor analysis that the measures studied appeared to be representing five facets. The five factor structure and the construct validity of the FFMQ were supported in a study by Baer *et al.* (2008). The KIMS was found to have good internal consistency and test-retest reliability (Baer *et al.,* 2004) while the five facets which the FFMQ incorporates were also found to have good internal consistency (Baer *et al.,* 2006).

The five facets are termed "observe", "describe", "act with awareness", "non-judge" and "non-react" (Baer *et al.,* 2008, p.330). The observe facet refers to the ability to consider inner and external events, while the describe facet concerns the ability to describe inner events with words (Baer *et al.*, 2008). The act with awareness facet involves an individual considering their actions in the present moment, rather than acting automatically. The non-judge facet refers to the ability to respond to inner events in a manner which is non-evaluative, while the non-react facet concerns the ability to allow inner events to happen without needing to respond to them (Baer *et al.*, 2008). Interestingly, Forman, Herbert *et al.* (2007) found in their study that changes in the observe and describe facets of the KIMS were most related to CT outcome, while

changes in the act with awareness and acceptance facets of the KIMS in addition to change in experiential avoidance were most related to the ACT intervention outcome.

Baer *et al.* (2008) reported results supportive of the construct validity of the FFMQ. As would be expected for a measure of mindfulness, Van Dam *et al.* (2009) found that individuals who meditated scored more highly on the FFMQ and scores also increased with greater amounts of meditation. However, Van Dam *et al.* (2009) also cautioned that scores on the FFMQ may increase with greater knowledge of mindfulness in the absence of mindfulness practice. The FFMQ can be seen in Appendix C.

Balanced Inventory of Desirable Responding

The Balanced Inventory of Desirable Responding version six (BIDR) was developed by Paulhus (1991) as a measure of social desirability. A seventh version has been published, however, Stöber *et al.* (2002) have stated that version six is used most often. The BIDR is a 40 item measure rated on a 7 point scale. It is described by Paulhus (1991) as having good internal consistency and correlates appropriately with other measures of social desirability. Paulhus (1991) reported that measure of social desirability did not always correlate highly with each other and factor analysis of these measures identified the presence of two main factors. Unlike other measures which consider social desirability to be a single construct, the BIDR measure was developed to incorporate two aspects of this construct, impression management and self-deception (Paulhus, 1991). This enables new measures to be considered in relation to each component of social desirability separately. Impression management is described by Paulhus (1991) as being a more conscious process to appear more desirable. Alternatively, self-deception is understood to occur outside conscious awareness and be more stable over time (Paulhus, 1991). Self-deception is described by Paulhus (1991) as the "tendency to give self-reports that are honest but positively biased" (p.37). It is understood to be an aspect of personality while impression management is more situation dependent.

Leite and Beretvas (2005) suggested that there is a lack of clarity regarding social desirability and its factor structure. They found that the BIDR did not fit a two factor model, although the self-deception subscale did fit a one factor model as would be expected. This is contrary to the results found by Kroner and Weekes (1996) who used an offender population and found that although two factors were found generally, the self-deception subscale split into two factors. The different populations may explain these varying results. Leite and Beretvas (2005) have suggested that measures of social desirability still need to be validated themselves and apply this to other such measures, not solely the BIDR. The BIDR may be scored in a continuous manner where the score for each item is counted (Stöber *et al.,* 2002). Alternatively, the BIDR can be scored in a dichotomous manner whereby only extreme scores are counted (Stöber *et al.,* 2002). Stöber *et al.* (2002) has recommended the use of the continuous scoring method. In their studies, Stöber *et al.* (2002) found that the continuous method yielded scores with higher internal reliability and were more likely to correlate with other social desirability questionnaires, therefore, this method was used in the current study. The BIDR can be seen in Appendix D.

Acceptance and Action Questionnaire

The Acceptance and Action Questionnaire, second version (AAQ-II) was developed by Bond *et al.* (submitted) as a revision of the original version developed by Hayes *et al.* (2004). It is a 10 item measure of experiential avoidance and the first version was demonstrated to have "acceptable" internal consistency (Hayes *et al*., 2004, p.572). High scores on this measure are indicative of high experiential avoidance. The first version was developed using both a clinical and community sample. The AAQ-II is quick to use, appears acceptable to participants and has face validity (Kortte *et al.,* 2009). Kortte *et al.* (2009) have queried the factor structure of the AAQ-II as they found a two factor structure as opposed to the one factor structure expected. It is possible that this is due to the "medical rehabilitation" sample used by Kortte *et al.* (2009, p.92) in their study. Conversely, the single factor structure was supported by McCracken and Zhao-O'Brien's (2010) study, although this was using a sample of individuals with

chronic pain. McCracken and Zhao-O'Brien's (2010) study also supported the construct validity and internal consistency of this measure. The AAQ-II can be seen in Appendix E.

2.2.4 Ethics

The primary researcher contacted the NHS board that they worked for to enquire as to whether ethical approval from the NHS was required. The primary researcher was advised that as the study was not utilising NHS patients, staff or buildings, ethical approval was outside the NHS remit. This information can be seen in Appendix F.

Ethical approval was then sought from the University of Edinburgh's Clinical Psychology ethics panel. Ethical approval was granted by this panel who also decided that further approval from the School of Health in Social Sciences was not required. This information can be seen in Appendix G.

2.2.5 Consent

Participants were clearly informed that they did not have to take part. They were advised that if they decided not to participate after reading the information sheet, they need do nothing more. Participants were also advised that if they were affected by anything in the questionnaires or if they required further information about the study, they could contact the primary researcher. Full contact details of the primary researcher and the research supervisor were provided. In addition to this, participants were provided with comprehensive information on what participation would involve. A copy of the participant information sheet can be seen in Appendices H (study one) and I (study two) for individuals who participated online and in Appendix J for participants who completed the paper version in study two.

2.2.6 Confidentiality

All identifying information was stored in a location only accessible by the primary researcher. Where participants completed the paper version of the questionnaires, their

contact details were removed and stored separately from the results. On the second testing occasion in study two, all participants were provided with unique identifying numbers in order that their responses on the two occasions could be matched without them having to provide their contact details again. At the end of the studies, all identifying information was destroyed. All participants were fully informed about how their results and information would be stored and managed.

2.2.7 Duty of Care

One of the questionnaires given to participants was a screening measure for symptoms of anxiety and depression, the HADS (Zigmond & Snaith, 1983). As the study was not fully anonymous, it was decided that the primary researcher had a duty of care to inform participants if they scored highly on this measure. As mentioned above, participants were asked to indicate whether they wished to receive this information if they did obtain high scores. In this measure, a score of at least 11 on each subscale is believed to indicate "definite cases" of anxiety or depression (Zigmond & Snaith, 1983, p.363). As mentioned above, there is some uncertainty about the HADS' ability to detect clinical cases with some studies suggesting it may identify more cases than is actually the case (Dunbar *et al.,* 2000). Herrmann (1997) also suggested that there is "no single, generally accepted cutoff score for the HADS" (p.21). It was thus decided that participants who requested feedback on this measure would be informed if they received scores of 13 or more. Participants were advised that they would receive this feedback after the second testing occasion. There were three participants who had scored highly and requested to be informed of this. All of these participants had completed the online version of the questionnaires. An email was sent to each participant which advised them that their scores were higher but emphasised that this measure was a screening tool only and was not diagnostic. This email also provided links to online information about anxiety and depression and it advised that participants contact their general practitioner if they felt they required more help with this. A copy of this email can be seen in Appendix K.

2.2.8 Procedure

The above measures were put online using the Bristol Online Survey Tool (Institute of Learning and Research Technology) to establish a single survey. This tool was chosen as it was used by the institution attended by the primary researcher. The location of the website was emailed to contacts of the primary researcher with a request to access the link for further information on the study and to participate. The email also requested that recipients forward it to others whom they thought may also be willing to participate, thus using a snowballing sampling technique. The content of this email can be seen in Appendix L and the participant information provided at the survey website can be seen in Appendix H. Using an online survey increased accessibility to the study and also reduced the amount of paper used. Administrators of the Bristol Online Survey Tool were allowed access to the survey, however, a filter was applied that allowed them only limited access to the results. This meant that participants' email addresses were only known to the primary researcher. Raw data were transferred to an excel spreadsheet, however, email addresses were not included in this spreadsheet. The data recorded by the survey tool were deleted following the completion of the study and this included the record of participants' email addresses.

2.2.9 Order of Questionnaires

The Bristol Online Survey Tool does not allow for randomisation of question order, thus the questionnaires had to remain in the same order for each participant. It has been highlighted by Johnston (1999) that putting the HADS amongst other questionnaires can influence HADS responses depending on the content of the other questionnaires. Therefore, it was decided that the HADS would follow the demographic questionnaire in order that completing the other questionnaires would not elevate participants' anxiety and depression responses. Given the similarity of the CFQ, FFMQ and the AAQ-II, it was decided that the BIDR would be positioned between the CFQ and FFMQ to alleviate the potential for monotony. Thus the final order of the questionnaires were as follows: Demographic Questionnaire, HADS, CFQ, BIDR, FFMQ, AAQ-II.

2.3 Study Two – Test-retest Reliability of the CFQ/Relationship with HADS

Study two assessed the test-retest reliability of the CFQ and how the CFQ related to symptoms of anxiety and depression.

2.3.1 Participants

A further 103 participants were recruited. These were combined with the participants in study one to total 150 participants. Six of these were excluded due to missing responses to the CFQ. This resulted in 144 participants for the analysis of relationship between the CFQ and the HADS. The sample consisted of 57 males and 87 females, 40 per cent males and 60 per cent females. The mean age of participants was 39 years and ages ranged from 18 to 77 years (SD 13.54), while 79 per cent of the sample had some form of further education.

Out of the 103 newly recruited participants, 61 consented to take part on the second occasion. Another 27 of the participants in study one consented to participate on a second occasion. After the six cases were excluded due to missing data, a total of 82 participants remained for the test-retest reliability analysis; 34 males and 48 females. Male participants constituted 41.5 per cent of the sample while 58.5 per cent were female and 60 participants had received some form of further education. The mean age of participants was 41 years (SD = 13.84) and ages ranged from 18 to 77 years. The majority of participants (71) completed the online version of the study while 11 participants completed the paper version (details below). All participants were contacted one month after their initial participation, however, the time they took to respond varied. The amount of days between testing time one and two was calculated for each participant. The mean number of days was found to be 33 and ranged from 28 to 56 days.

2.3.2 Exclusion Criteria

The same exclusion criteria applied in study one was used in this study.

2.3.3 Measures

Study two used the demographic questionnaire, the HADS and the CFQ as detailed above. On the second testing occasion, the demographic questionnaire was not required. Participants were provided with a unique identifying number to enter when completing the questionnaires on the second occasion. Using the HADS on both occasions would allow for comparison between scores on these two measures. If scores on the CFQ were found to vary between the two testing occasions this may be due to changes in anxiety and depression symptoms and use of the HADS on both occasions would allow this to be measured. It also allowed for mediation analyses as detailed in the introduction section.

2.3.4 Procedure

New participants were contacted using the same email procedure as outlined above. Participant information for this study can be seen in Appendix I. After a period of one month, participants were emailed by the primary researcher with details of the weblink to access further information on the study and the questionnaires. The content of this email can be seen in Appendix M. In addition to this, participants were provided with a unique identifying number known only to the primary researcher. This meant that they did not have to re-enter their email address, thus ensuring confidentiality. At the start of participation on the second occasion, participants were requested to enter this number.

In addition to the use of the online method of participation, a paper and pencil method was also developed in order to enable a wide cross section of the population to participate in the study. Two supermarkets were contacted by the primary researcher with the request that copies of the questionnaire packs be distributed amongst their staff. Both supermarkets consented to this and 20 copies of the questionnaire packs were given to each of them. In addition to this, a hotel was contacted by the primary researcher and 10 copies of the questionnaire packs were distributed for the staff who worked there. Paper copies of the questionnaire packs were also given to contacts of the primary researcher who did not have access to the internet. A further 20 paper copies were

distributed to small businesses for staff to complete and members of the public. Full details about the study were attached to each pack of questionnaires along with a stamped addressed envelope for returning the questionnaires. The participant information provided with the questionnaires can be seen in Appendix J. In this case, participants were requested to record their name and address, rather than their email address if they wished to participate again on the second occasion. When the questionnaires were posted back to the primary researcher, contact details were removed from the questionnaires which were then given a unique identifying number. Contact details were stored separately from the questionnaires and then destroyed once participants had been sent the questionnaire pack on the second occasion.

2.3.5 Order of Questionnaires

On both testing occasions, participants were presented with the demographic questionnaire, followed by the HADS and the CFQ. Both online and paper versions followed this order for consistency.

2.4 Study Three – Factor Analysis of the CFQ

Study three aimed to replicate the factor analysis carried out by Dempster (2009) but with a different population.

2.4.1 Participants

The same sample was used in this study as in the CFQ and HADS analysis in study two. All of the participants who participated in studies one and two were included. As detailed in study two, six participants were excluded due to missing data. This resulted in a total of 144 participants, 57 males and 87 females. The sample consisted of 40 per cent males and 60 per cent females. The mean age of participants was 39 years (SD = 13.54) and ages ranged from 18 to 77 years, while 79 per cent of the sample had some form of further education. A table detailing the demographics of the samples used in the study can be seen below.

Table 1 Demographics of the Samples Used in Each of the Three Studies

	Study One	**Study Two Test-retest reliability analysis**	**Study Two Analysis of HADS and CFQ data**	**Study Three**
Number of participants	47	82	144	144
Mean Age of Participants	35 years	41	39 years	39 years
Standard Deviation of Age	11.54	13.84	13.54	13.54
Age Range	21 – 73 years	18 – 77 years	18 – 77 years	18 – 77 years
Total Male	24	34	57	57
Total Female	23	48	87	87
Further Education	85 per cent	73 per cent	79 per cent	79 per cent

2.4.2 Procedure

As each participant had completed the CFQ in either study one or two, no new procedure was required for this study. Results from every completed CFQ at testing time one were collated in order that a confirmatory factor analysis could be carried out.

2.5 Analytic Plan

2.5.1 Study One

Total scores for each of the measures were calculated for each participant. In order to establish whether the CFQ related to the other measures used in the study, correlational

analysis was used. SPSS version 17 was used to carry out the analysis using Pearson's correlation coefficient (Field, 2005).

2.5.2 Study Two

Total scores for each participant were calculated at both times of testing. Correlational analysis was again used to consider the relationship between CFQ scores at time one and time two and to consider the relationship between the CFQ and the HADS. SPSS version 17 was used to carry out the analysis using Pearson's correlation coefficient (Field, 2005). Multiple regression and the Sobel test were used to further explore the relationship between the CFQ and the HADS subscales (Baron & Kenny, 1986).

2.5.3 Study Three

Responses for each participant were gathered for each item of the CFQ. EQS for Windows version 6 was used to carry out the confirmatory factor analysis (Bentler & Wu, 2002).

2.6 Missing Data

In many studies, the problem of missing data is managed by deleting cases from the analyses. However, this is likely to reduce the sample variance in addition to lowering the sample size (Jackson *et al.,* 2009). Other techniques can be used to deal with missing data and Shrive *et al.* (2006) carried out a study to assess these. Shrive *et al.* (2006) reported that both multiple imputation and individual mean imputation performed well. There are, however, disadvantages to both. Using the individual mean in the place of missing values reduces the variability of response (Hawthorne & Elliot, 2005). The individual mean is a simpler method, however, than multiple imputation and Shrive *et al.* (2006, p.57) caution that multiple imputation "is complex and likely to be unfamiliar to many readers and researchers".

It was decided that where participants had missed more than ten per cent of responses, they would be excluded from the analyses. If they missed more than ten per cent of total

responses, the case was removed completely from the study. In cases where more than ten per cent of responses for a single measure were missing, the case was removed from the analyses for that particular measure only. In cases where less than ten per cent of responses were missing, individual means were used to replace missing values. In study one, two cases had missing data replaced in the HADS and another two had missing data replaced in the CFQ. Six cases had missing data replaced in the FFMQ and four in the BIDR. Two cases had missing data replaced in the AAQ-II. In study two, eight cases had missing data replaced in the CFQ at testing time one. At testing time two, three cases had missing data replaced in the CFQ and one case had missing data replaced in the HADS. In study three, eight cases had missing data replaced in the CFQ. In all of these cases, ten per cent or less of the responses were missing and subsequently replaced. One case was excluded from the whole of study one as data were missing from the CFQ. One case was excluded in the analyses between the CFQ and the AAQ-II due to missing data in the AAQ-II. One case was also excluded in the analyses between the CFQ and the BIDR due to missing responses to the BIDR. No other cases were required to be removed. In studies two and three, six cases were excluded from the analyses due to missing data in the CFQ.

3 RESULTS

3.1 Study One

The frequencies from each measure can be seen in Table 2.

Table 2 – Frequencies for CFQ, FFMQ, BIDR and AAQII

Measure	Mean Total Score	Standard Deviation	Range
CFQ	37.5	11.8	18-65
FFMQ	133.5	18	92-166
BIDR Self-deception	90.9	15.1	59-121
BIDR Impression Management	82.9	14.4	55-120
AAQII	24.9	7.8	12-42

The distribution of the data was analysed. Data gathered on the CFQ was not significantly skewed, although the Kolmogorov-Smirnov test was significant. Transforming the data using log transformations was found to remove the significance of this test. Three outliers were removed from the AAQ-II data in order to ensure the data were normally distributed. The data from the FFMQ total score was found to be normally distributed. When the five facets of the FFMQ were considered individually, the observe, describe and non-judge facets had significant Kolmogorov-Smirnov tests. However, their skewness and kurtosis scores were not significant. Transforming the data did not help with the normality of the observe facet data, therefore, the raw data were used. Square root transformed data was used with the describe facet and log transformed data were used with the non-judge facet. The Kolmogorov-Smirnov test was significant for the impression management subscale of the BIDR only. The removal of three outliers removed the significant result.

A large negative correlation was found between scores on the CFQ and scores on the FFMQ, r = -.61; n = 47; p <.01 (one tailed). This relationship is illustrated in Figure 1.

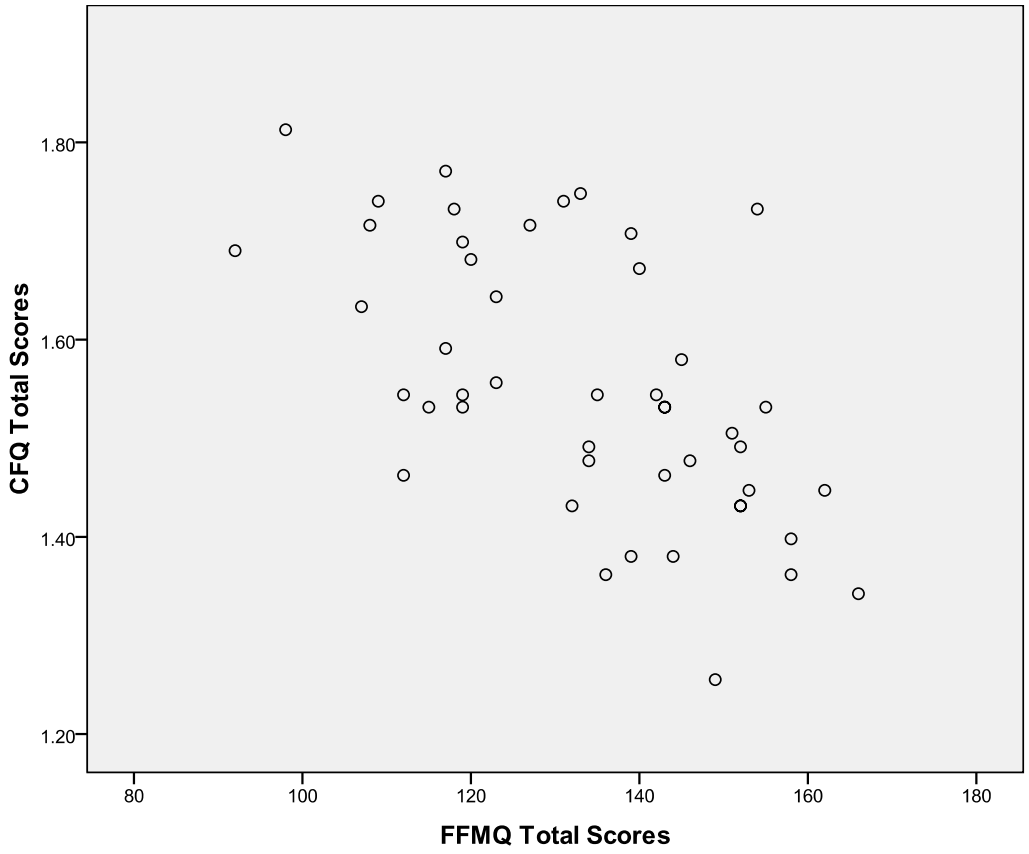
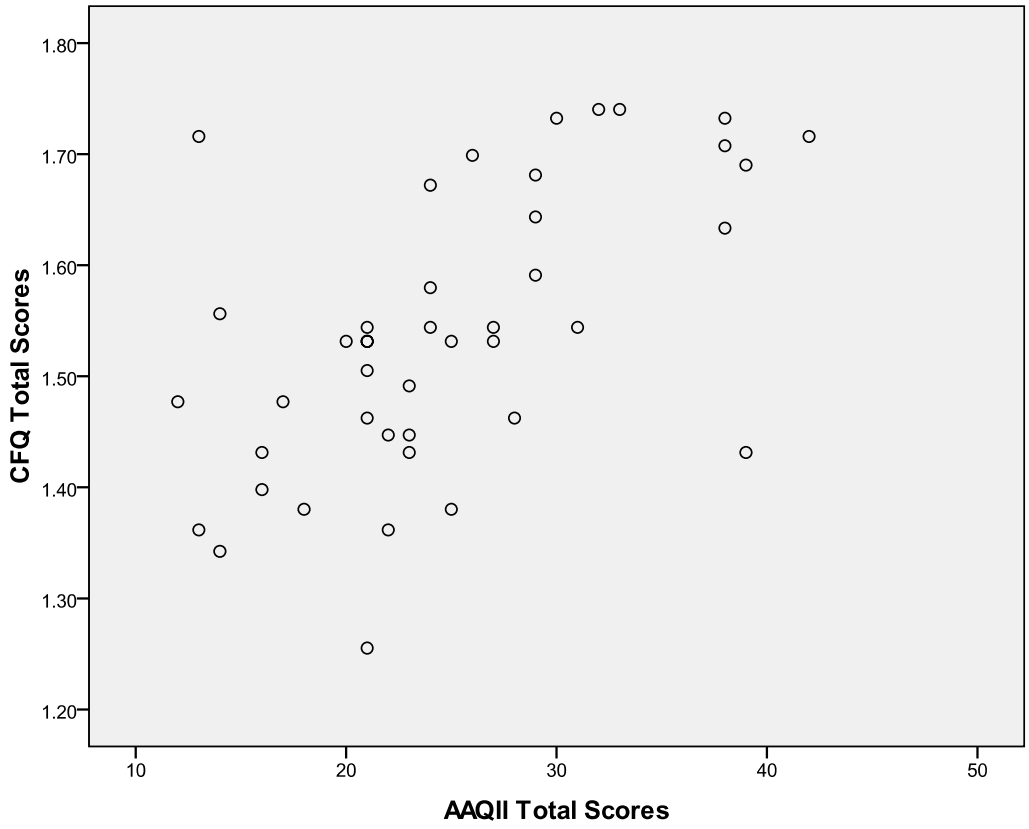


Figure 1 – Scatterplot of CFQ and FFMQ Total Score Correlations

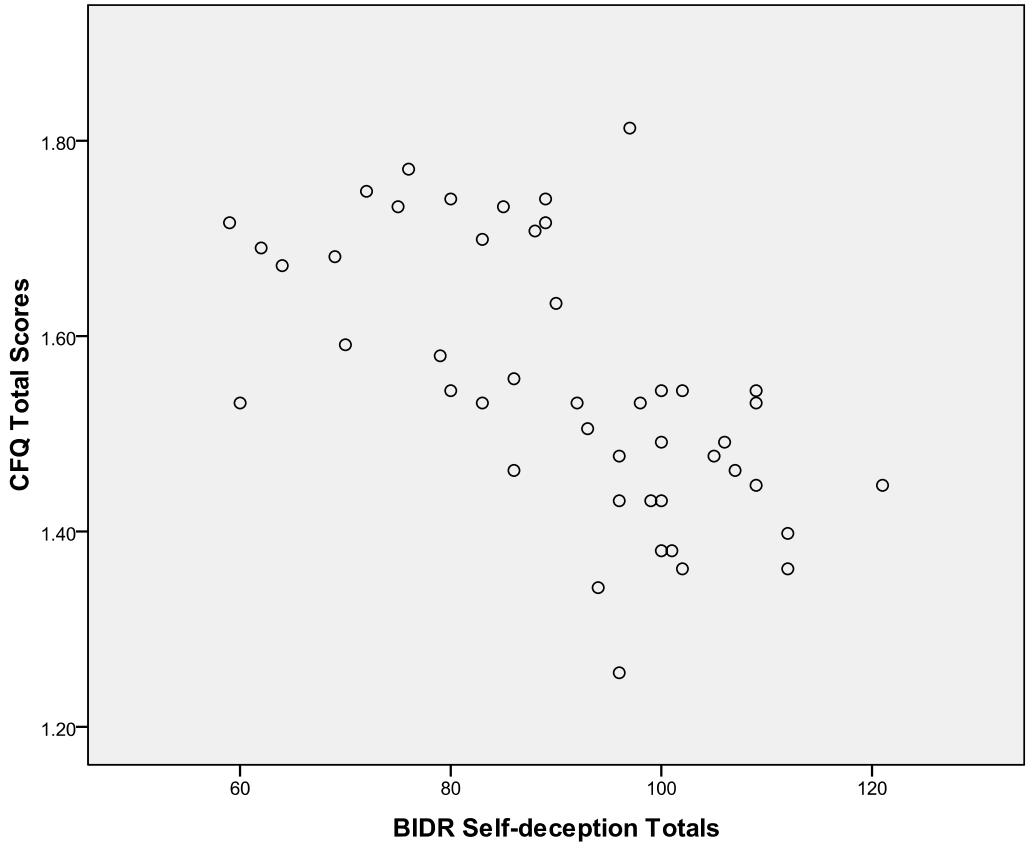
When the different facets of the FFMQ were considered individually, no significant relationships were found between the CFQ and the observe and describe facets respectively. A moderate negative correlation was found between the CFQ and the act with awareness facet, r = -.49; n = 47; p <0.1 (one tailed). A larger negative correlation was found between the CFQ and the non-judge facet, r = -.62; n = 47; p<.01. A significant negative correlation was also found between the CFQ and the non-react facet, r = -.57; n = 47; p <.01 (one tailed).

A strong positive correlation was found between scores on the CFQ and scores on the AAQ-II, r = .58; n = 43; p <.01 (one tailed). This relationship can be seen in Figure 2.



<u>Figure 2</u> – Scatterplot of CFQ and AAQII Total Score Correlations

A negative correlation was found between CFQ scores and scores on the self-deception subscale of the BIDR, r = -.61; n = 46; p<.01. No significant relationship was found between scores on the CFQ and scores on the impression management subscale of the BIDR. These results can be seen in Figures 3 and 4 below.



<u>Figure 3</u> – Scatterplot of CFQ and BIDR Self-deception Total Score Correlations

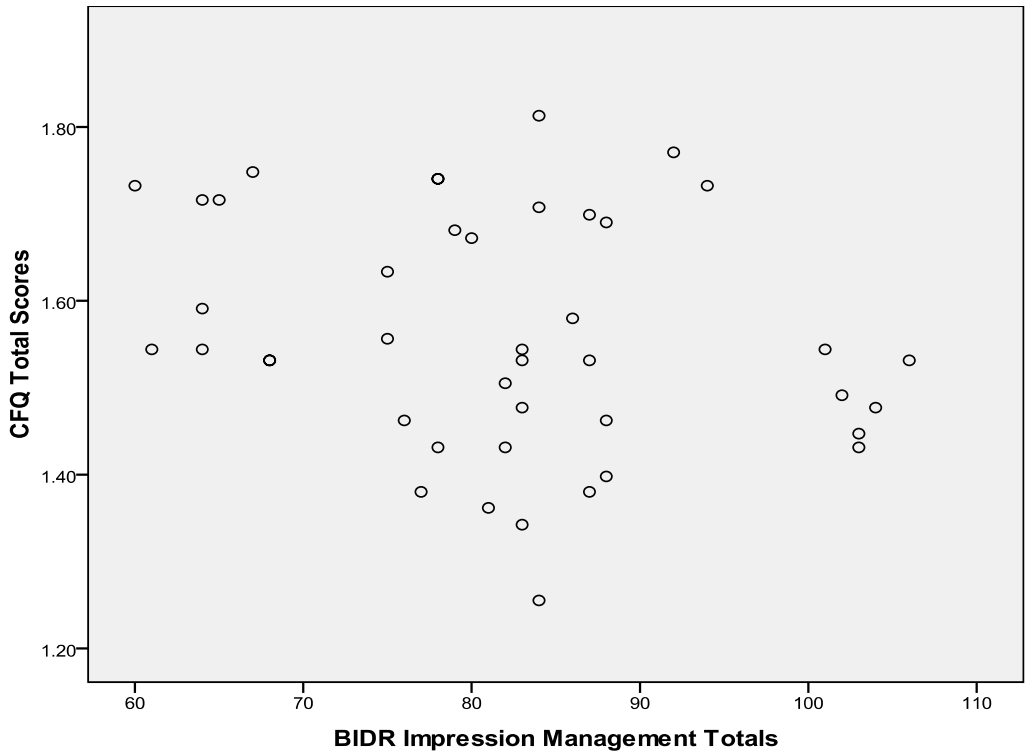


Figure 4 – Scatterplot of CFQ and BIDR Impression Management Total Score Correlations

A summary of the correlation coefficients can be seen in Table 1.

Table 3 – Summary of Correlation Coefficients

Measure	**Correlation Coefficient**
FFMQ	-.61*
FFMQ Observe facet	.06
FFMQ Describe facet	-.17
FFMQ Act with Awareness facet	-.49*
FFMQ Non Judge facet	-.62*
FFMQ Non React facet	-.57*
BIDR Impression Management (continuous)	-.26
BIDR Self-deception (continuous)	-.61*
AAQ-II	.58*

* = significant at .01 level

3.2 Study Two

The frequencies of each measure from testing time one can be seen in Table 3.

Table 4 – CFQ, HADS Anxiety and HADS Depression Frequencies at Time One

Measure	Mean Total Score	Standard Deviation	Range
CFQ	37.2	10.9	17-65
HADS Anxiety	6.6	3.4	0-16
HADS Depression	3	2.5	0-14

The distribution of the data was analysed. At testing time one, CFQ data was found to be positively skewed and the Kolmogorov-Smirnov test was significant. The use of log transformations reduced the skew and this test was no longer significant. At testing time two, CFQ data were again positively skewed, although the Kolmogorov-Smirnov test was not significant. The removal of an outlier reduced the skew.

At testing time one, the skewness and kurtosis scores on the HADS anxiety subscale were not significant, however, the Kolmogorov-Smirnov test was significant. Transforming the data did not remove the significance of this test, therefore, the raw data were used. Two outliers were removed from the HADS anxiety data at testing time two which reduced the significance of the skewness and kurtosis scores, however, the Kolmogorov-Smirnov test was still significant.

Scores on the depression subscale of the HADS were found to be significantly positively skewed at both testing times and the Kolmogorov-Smirnov test was significant on both occasions. Transforming the data did not affect the results of the Kolmogorov-Smirnov tests but did reduce the skewness and kurtosis scores to normal levels, therefore, log transformed data were used with the data from time one and square root transformed data were used with the data from testing time two.

The data analysis found a strong positive correlation between participant scores on the CFQ at testing times one and two, r = .76; n = 81; p <.01 (one tailed). This result can be seen in Figure 5.

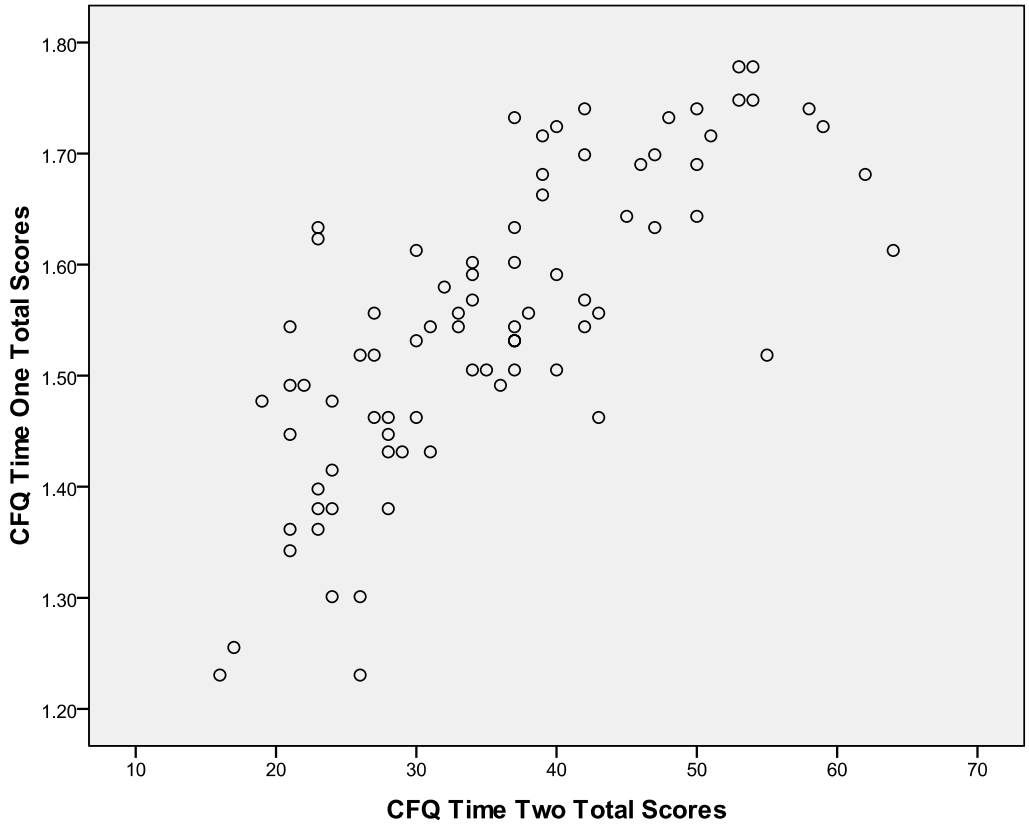


Figure 5 – Scatterplot of Correlation between CFQ Total Scores at Time One and Time Two

A strong positive correlation was found between scores on the anxiety subscale of the HADS and scores on the CFQ at testing time one, r = .54; n = 144; p <.01 (one tailed). This can be seen in Figure 6.

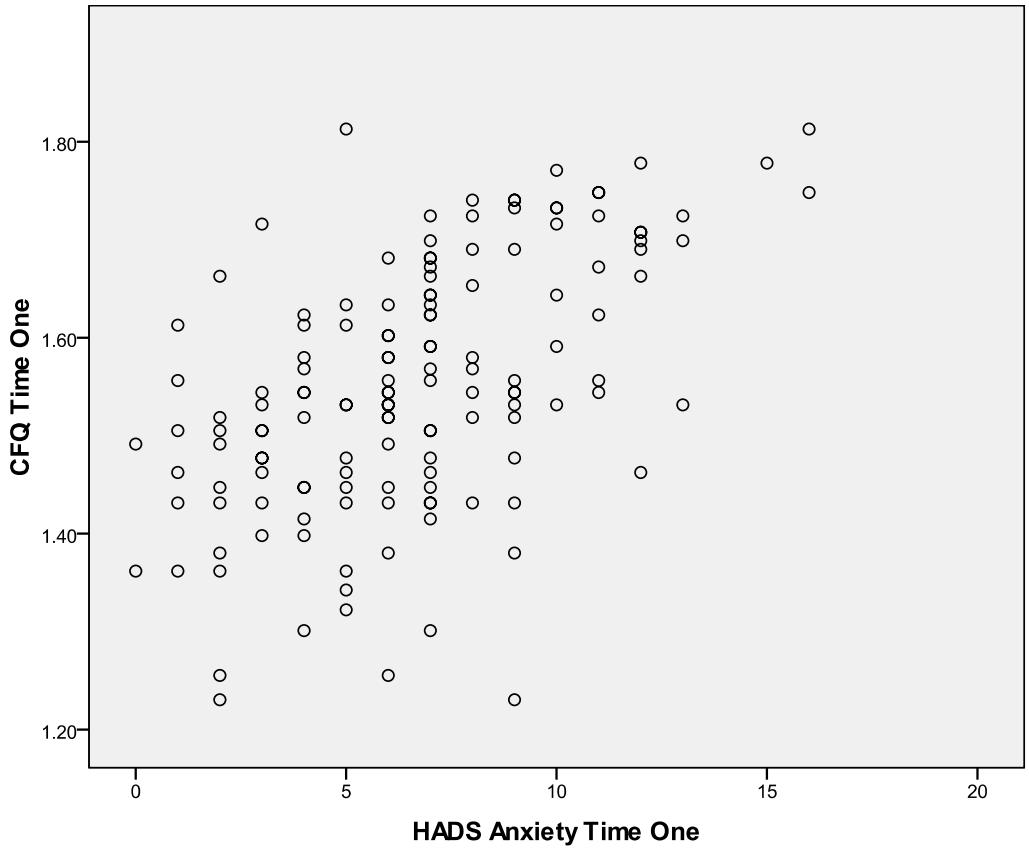


Figure 6 – Scatterplot of Correlation between CFQ Total Scores and HADS Anxiety Total Scores at Time One

A positive correlation was found between scores on the depression subscale of the HADS and the CFQ at testing time one, r = .39; n = 144; p <.01 (one tailed). This relationship can be seen in Figure 7.

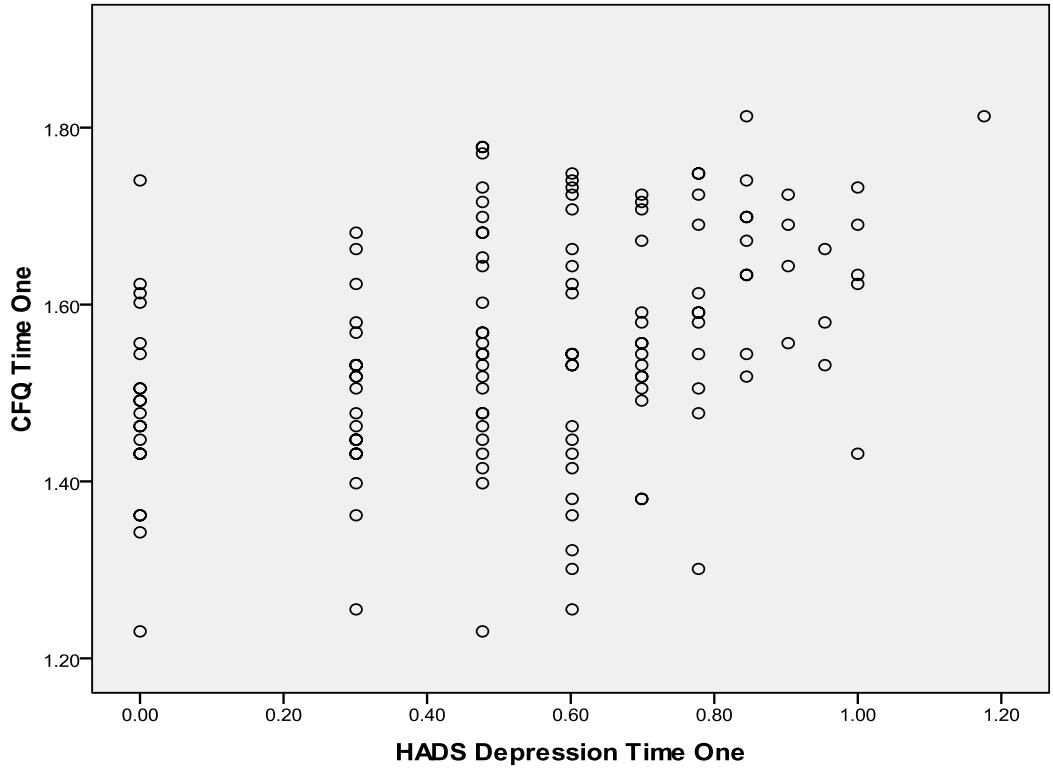


Figure 7 – Scatterplot of Correlation between CFQ Total Scores and HADS Depression Total Scores at Time One

Scores on the CFQ at time one were also found to positively correlate with scores on the anxiety subscale of the HADS at time two, r = .53; n = 80; p <.01 (one tailed). Scores on the CFQ at time one were moderately correlated with scores on the depression subscale of the HADS at time two, r = .31; n = 82; p <.01 (one tailed).

3.2.1 Mediation Analyses

To test for mediation, a number of steps must be followed (Baron & Kenny, 1986). Regression equations must be considered between the independent variable and the dependent variable, between the independent variable and the mediator and between the

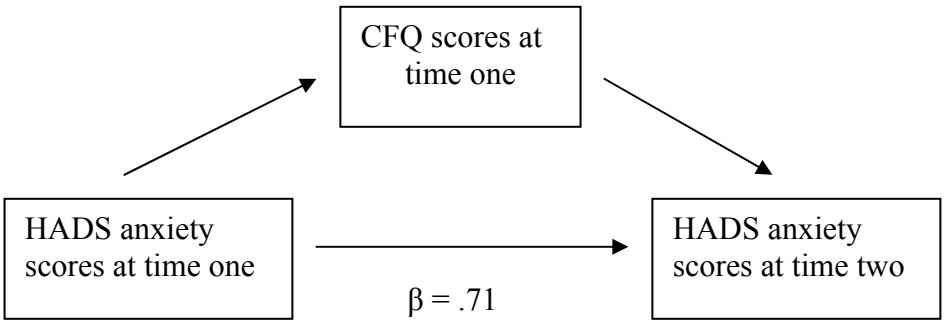
dependent variable and the mediator and independent variables (Baron & Kenny, 1986). If the mediator does show evidence of full or partial mediation of the relationship between the independent variable and the dependent variable, the significance of that mediation also has to be tested and one way in which to do this is to use the Sobel test (Baron & Kenny, 1986).

The relationship between the HADS and the CFQ was further explored using multiple regression. A significant relationship was found between HADS anxiety scores at testing time one and two, $\beta = .71$; $p < 0.01$. A significant relationship was also found between the HADS anxiety scores at time one and CFQ scores at time one, $\beta = .54$; $p<0.01$. In addition to this, a significant relationship was found between the CFQ at time one and HADS anxiety at time two while controlling for HADS anxiety at time one, $\beta = .22$; $p<0.05$. When the CFQ scores at time one were included in the analyses, this was found to attenuate the relationship between HADS scores at time one and time two, $\beta = .59$; $p<0.01$. The Sobel test was used to test whether the mediation was significant which produced a statistic of 2.28; $p<0.05$. Thus, while the level of anxiety symptoms at time one predicts the level of anxiety participants will experience one month later, this relationship is partially mediated by the degree of cognitive fusion at time one.

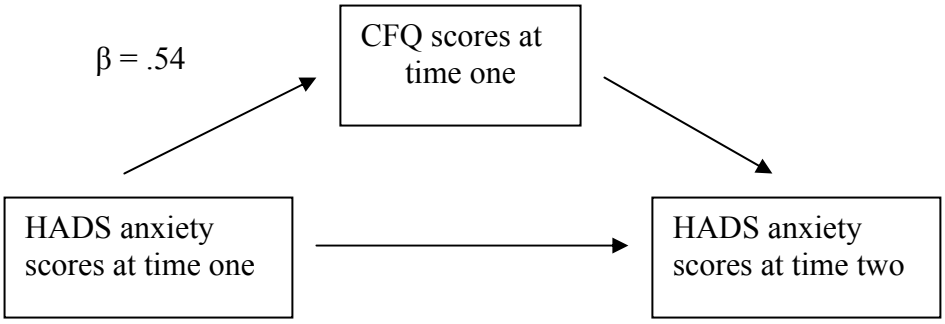
The same method was applied to the depression subscale of the HADS. A significant relationship was found between HADS depression scores at testing time one and testing time two, $\beta = .52$; $p < 0.01$. A significant relationship was also found between the HADS depression scores at time one and CFQ scores at time one, $\beta = .39$; $p<0.01$. The relationship between the CFQ at time one and HADS depression at time two, while controlling for HADS depression at time one, was not significant $\beta = .14$; NS. Thus cognitive fusion does not mediate the relationship between depression scores between time one and time two.

A schematic representation of the mediation analysis for HADS anxiety can be seen in Figure Eight.

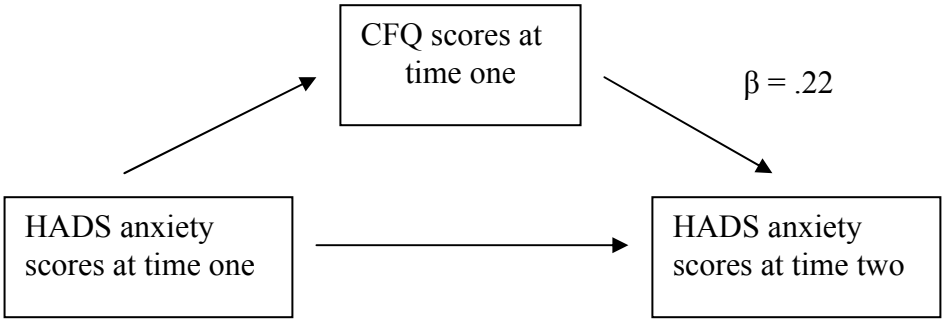
Step one: A significant relationship is found between the predictor variable (HADS anxiety at time one) and the dependent variable (HADS anxiety scores at time two).



Step two: A significant relationship is found between the predictor variable and mediator variable (CFQ scores at time one).



Step three: A significant relationship is found between the mediator variable and the dependent variable while controlling for the predictor variable.



Step four: Including the mediator attenuates the relationship between the predictor variable and the dependent variable.

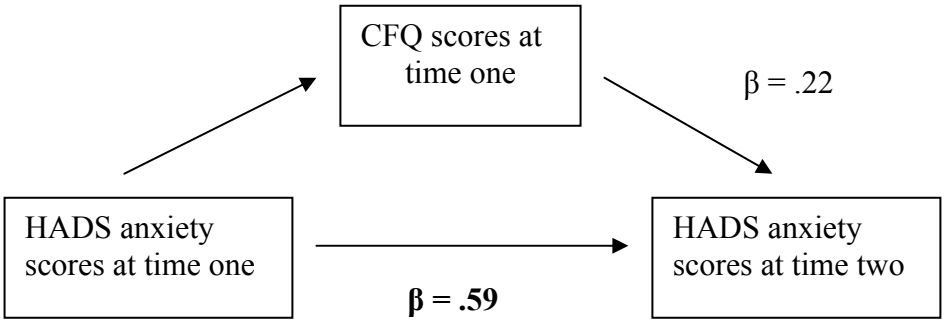


Figure 8 – Schematic Representation of Mediator Role of CFQ Total Scores at Time One in Relationship between HADS anxiety Total Scores at Time One and Time Two.

3.3 Study Three

The internal consistency of the CFQ was measured using Cronbach's alpha and found to be .81. The data were investigated for normality. This found that eight of the items were positively skewed and the Kolmogorov Smirnov test was significant for all of the items. Transforming the data did not significantly change the results, therefore the raw data were used. As the exploratory factor analysis by Dempster (2009) found a two factor model to be the best fit of the data, this model was also used in the present study. Most of the items were expected to load onto the first factor, with the four reversed scored items (items 3, 6, 9 and 12) loading onto the second factor. A correlated two factor model and a one factor model were also assessed. The results can be seen in Table 5 as follows.

Table 5 – Results of Confirmatory Factor Analysis Detailing Goodness of Fit Indices for the Models Tested

Statistics	**One factor model**	**Two factor model**	**Two factor correlated model**
Bentler-Bonett non-normed fit index	0.798	0.944	0.942
Comparative fit index	0.835	0.955	0.954
Root mean-square error of approximation	0.111	0.058	0.06
Chi-square	176.839	93.815	93.579
Chi-square significance	$p<.001$	$p<.01$	$p<.01$

Bentler and Bonett (1980, p.600) stated that "models with overall fit indices of less than .9 can usually be improved substantially". Schreiber *et al.* (2006, p.330) have proposed that root mean-square error of approximation cutoff scores are <.06 to .08 for "acceptable fit". In addition to this, they suggested that comparative fit index cutoff scores should be ≥.95 to be satisfactory. Thus, the two factor model was found to be a

good fit. The chi-square score significantly reduced from the one factor to the two factor model, suggesting that the two factor model is a better fit. Correlating the two factors did not significantly change the outcome, thus it did not produce a better model fit.

4 DISCUSSION

4.1 Study One

Study one considered the validity of the CFQ. As expected, the CFQ correlated negatively and significantly with the FFMQ, thus as cognitive fusion increases, mindfulness scores decrease. This supports the construct validity of the CFQ as it has been found to correlate in the expected direction with a measure of a related construct. A fairly large correlation was found (see table 3, p.71) and this may reflect the similarities between mindfulness and defusion as discussed in the introduction section. The fact that this relationship was strong may support the argument that defusion and mindfulness are the same constructs. As discussed above, descriptions of defusion and mindfulness are very similar (Brown & Ryan, 2004; Hayes & Shenk, 2004). However, mindfulness itself is not yet fully understood which makes it more difficult to understand this construct in relation to defusion.

Interestingly, the CFQ did not correlate with the observe or describe facets of this measure. During assessment of the FFMQ, Baer *et al.* (2006) reported uncertain findings in terms of how the observe facet correlated with other constructs. It also did not fit with the confirmatory factor analysis model tested by Baer *et al.* (2006). In a later study, Baer *et al.* (2008) found that the observe facet functioned in a different manner for individuals with experience of meditation. Baer *et al.* (2008) suggest that observing may not always be done in a mindful manner and if this is the case, may actually contribute to psychological difficulties. McKee *et al.* (2007) also found that the observe facet of the KIMS (from which the FFMQ was developed) was not related to "anxiety sensitivity" or "negative affectivity" (p.97). The other facets were found to relate to at least one of these constructs. These results suggest that 'observe' may not always operate in a mindful way and this may explain why this facet did not correlate with the CFQ.

Larger negative correlations were found between the CFQ and the act with awareness, non-react and non-judge facets. When considering the definitions of the separate facets, it is perhaps understandable why the CFQ related most strongly with the non-judge facet. This facet is described by Baer *et al.* (2008) as "taking a non-evaluative stance toward thoughts and feelings" (p.330). Similarly, the non-react facet, with which the CFQ is also strongly related is described as "the tendency to allow thoughts and feelings to come and go without getting caught up in or carried away by them" (Baer *et al.,* 2008, p.330). These descriptions have obvious parallels with definitions of cognitive defusion. As reported in the method section above, Forman, Herbert *et al.* (2007) found that change in the observe and describe facets of the KIMS were most strongly related to CT outcome in their study. The other facets of the KIMS in addition to experiential avoidance were found to be related more to the ACT outcome. This result is consistent with the present finding that the CFQ did not relate to the observe and describe facets of the FFMQ. The results in relation to the FFMQ support and build upon the finding by Dempster (2009) that the CFQ had a large negative correlation with the Southampton Mindfulness Questionnaire (SMQ) (Chadwick *et al.* 2008). As mentioned in the introduction section, the SMQ was developed to consider mindful responding to psychotic symptoms, while the FFMQ assesses mindfulness as a multi-faceted construct. Further research will be required to tease out the relationship between the CFQ and measures of mindfulness. The sample size in study one was not large and this may have influenced the results.

As expected, the CFQ positively correlated with the AAQ-II. Therefore, as CFQ scores increased, experiential avoidance scores also increased. This supports the results found by Dempster (2009) who found a large correlation between these measures. Dempster (2009) had cautioned that the strong correlation found may indicate that the AAQ-II and the CFQ are not entirely distinct. This is not surprising given that cognitive fusion and experiential avoidance are closely related and both contribute to psychological inflexibility (Hayes *et al.,* 2006). Cognitive fusion is also believed to encourage experiential avoidance (Greco *et al.,* 2008). In addition to this, there is some similarity

between items in these measures. Again this is to be expected as the AAQ-II is a measure of experiential avoidance which includes avoidance of thoughts (Hayes *et al.,* 2004). It is possible that the AAQ-II has focused too much on the avoidance of thoughts. Although the current study found a correlation between these measures, it was smaller than that found by Dempster (2009). Barker *et al.* (2002) have suggested that correlations of greater than r = .7 indicate that two measures are assessing the same construct and reported that correlations of r = .5 indicate good validity. The correlation between the CFQ and the AAQ-II found in the current study (r = .58) is closer to r = .5 which suggests good validity. Interestingly, the correlation between the FFMQ and the CFQ was greater than this (r = .61). Further research is required to investigate the relationship between the AAQ-II and the CFQ. The small sample size in the current study must also be noted, particularly after the removal of three outliers for this particular analysis.

No significant relationship was found between the impression management subscale of the BIDR and the CFQ. The absence of a significant correlation between the impression management subscale and the CFQ may indicate that participants in the current study were not consciously attempting to appear more desirable. A significant negative relationship was identified between the self-deception subscale of the BIDR and the CFQ. A negative correlation suggests that as self-deception scores increase, cognitive fusion scores decrease. It has been suggested that self-deception is a more unconscious process while impression management is situation dependent and individuals are more aware of their attempts to appear socially desirable in this respect (Paulhus, 1991). The current finding may suggest that individuals who are more self-deceiving may respond with lower scores on the CFQ. It is possible that these results indicate that individuals with high levels of cognitive fusion have greater self-awareness. This result appears contradictory, suggesting that those who are less fused with their thoughts are also less self-aware. However as stated in the method section above, Paulhus (1991) described self-deception as the "tendency to give self-reports that are honest but positively biased" (p.37). Paulhus (1991) has also noted that self-deception scores correlate positively with

adjustment, while Stöber *et al.* (1991) stated that they correlate positively with self-esteem but negatively with "anxiety, depression and distress" (p.372). Paulhus (1991) further cautioned that a strong relationship between a measure and the self-deception subscale does not necessarily indicate a flaw in that measure. This is due, it is argued, to self-deception being an aspect of "personality constructs" (Paulhus, 1991, p.22) while impression management tends to be independent of these and influenced more by the situation. If the self-deception subscale relates to internal upset as described, this may explain why the CFQ negatively correlated with this measure as the CFQ was found to relate positively to the HADS. Paulhus (1991) concluded that only impression management should be controlled for, while controlling for self-deception has been found to reduce the predictive validity of a measure.

4.2 Study Two

Study two considered the test-retest reliability of the CFQ and also how it related to a measure of anxiety and depression symptoms. Gravetter and Wallnau (2000) stated that a measure is assumed to be reliable if it produces "stable, consistent measurements" (p.530). As detailed above, a large positive correlation was found between scores on the CFQ at time one and two. This suggests that the CFQ has high test-retest reliability and should consistently yield the same results over time. The CFQ is thus likely to be useful in measuring change over time and there can be greater confidence in the scores obtained. As cautioned by Barker *et al.* (2002), however, the large correlation may also indicate that the CFQ is insensitive to change. As discussed in the introduction section, fusion and defusion are not permanent states, they vary depending upon the context, although it is likely that some individuals engage in cognitive fusion more often than others (Blackledge, 2007).

Further research is required to investigate the sensitivity of the CFQ. It is possible that the relatively short period of one month between the two testing occasions has contributed to the high correlation. It would be useful to consider how the CFQ performs over longer testing periods, particularly as psychological therapy is likely to

cover a greater time period than one month. The use of a community sample may also have influenced the results. It would be expected that such a sample will demonstrate less change than, for example, a clinical sample undergoing psychological therapy. This emphasises the need for further assessment of the CFQ, in particular in a clinical population and also with individuals who are in therapy. Indeed, Hayes *et al.* (1987) highlights the importance of establishing whether measures have clinical utility, that is, whether they are useful in clinical work. Hayes *et al.* (1987) state that while it is important for measures to demonstrate good reliability and validity, this is redundant if they are not functional in everyday therapeutic settings. In addition to this, Clark and Watson (1995) state that "a series of investigations is required even to begin the process of identifying the psychological construct that underlies a measure" (p.310). At present it is unknown whether the CFQ will be of benefit clinically, however, the CFQ continues to be tested and is currently being assessed in a depressed sample (Kerr, 2010).

In addition to this, study two found moderate correlations between the CFQ and the anxiety and depression subscales of the HADS respectively. It is not surprising that the CFQ has correlated with the HADS. If cognitive fusion is involved in psychopathology as believed (Blackledge, 2007), it would be expected that a measure of cognitive fusion would correlate with a measure of anxiety and depression symptoms. These results are supportive of the construct validity of the CFQ. It is interesting that the CFQ correlated more strongly with the anxiety subscale of the HADS than the depression subscale. The two subscales of the HADS have been found to be highly related (Bjelland *et al.,* 2002) and thus it may be surprising that the depression subscale was not more highly correlated with the CFQ. This may be due to the fact that scores on the depression subscale tended to be low in this study. The HADS is a measure of anxiety and depression symptoms but it is not used to diagnose anxiety and depression (Herrman, 1997). It may be more useful to consider how the CFQ relates to diagnostic measures.

Alternatively these results may suggest that cognitive fusion plays a greater role in the experience of anxiety than it does in depression. As discussed in the introduction

section above, Mindfulness Based Cognitive Therapy (MBCT) has been developed specifically to treat individuals suffering from recurring depression (Segal *et al.,* 2002). A particular strategy within this approach is the use of decentring and the parallels between this construct and defusion have been discussed above. Ma and Teasdale (2004) have found that MBCT is most effective for individuals who have experienced at least three episodes of depression. If decentring and defusion are related as suggested, it is possible that the low depression scores in the current study mean that fusion is more likely to be implicated in more severe levels of depression.

Interestingly, the relationship between scores on the HADS anxiety subscale at time one and time two were influenced by the scores on the CFQ at time one. Including the CFQ in the regression analyses resulted in a reduction in the variance accounted for by HADS scores at time one. CFQ scores at time one could thus be described as a partial mediator in the relationship between the HADS anxiety scores at time one and time two. MacKinnon *et al.* (1995) stated that "a mediator is a variable that accounts for all or part of the relation between a predictor and an outcome" (p.41). In this case, the CFQ was found to account for some of the variance between HADS anxiety at time one and time two which indicates it is a partial mediator. It would be expected that HADS anxiety scores at time one and time two would be highly correlated and it is noteworthy that the CFQ accounts for some of the variance. It would seem that cognitive fusion plays a role in anxiety symptoms over time. The same was not found for depression, suggesting that anxiety and depression symptoms may have different relationships with cognitive fusion in this sample of healthy adults. It should be noted that the method used is not the only procedure for testing mediation, however, it is the most common (MacKinnon *et al.,* 2002). It must also be emphasised that identifying mediation does not establish a causal relationship.

It has been suggested by Lundgren *et al.* (2008) that mediational studies are especially useful for studying ACT in order to demonstrate that results from ACT studies are due to the processes involved in this model. The mediational analysis in study two adds weight

to the argument that cognitive fusion plays a role in the presence of anxiety symptoms. Arch and Craske (2008) suggested that mediational studies would help identify how useful defusion techniques are. Further research could consider the use of defusion techniques as an intervention for anxiety disorders to further explore whether the process of defusion in particular can account for therapeutic change in anxiety problems.

4.3 Study Three

Study three considered the factor structure of the CFQ. The internal consistency of this measure was found to be high which supports the findings of Dempster (2009). In further support of Dempster's (2009) results, confirmatory factor analysis found a two factor model to be the best fit of the data, indicating that the CFQ measures cognitive fusion and defusion. It must be emphasised, however, that factor analysis does not allow for causal relationships to be identified (Breckler, 1990). There was a large reduction in chi-square from the one factor to two factor model, again supporting the fit of the two factor model. Correlating the two factors did not produce a better model fit. As mentioned in the introduction section, the developers of the CFQ have proposed a one factor model and have suggested that the two factors reflect method variance pertaining to the wording of the questions (that is, some of the questions are reversed in order to prevent response bias) (Gillanders, personal correspondence, 14 June 2010). The current findings are not consistent with this as correlating the two factors did not significantly improve the model fit.

As noted in the results section, the distribution of the data in study three tended to be positively skewed. It is possible to carry out factor analysis using distribution free methods, however, large samples are required for this (Boomsma, 2000). Jackson *et al.* (2009) have advised that where distributions are not normal, there is increased risk of making a Type I error. Although the fit of the two factor model in the current study may have been overestimated, it was still found to be a better fit than the one factor model and this result is consistent with the exploratory factor analysis carried out by Dempster

(2009). In addition to this, during the development of the CFQ, items were selected based on whether they were normally distributed (Dempster, 2009).

4.4 Limitations

Some biases may be present in the data collected. More females than males participated in studies two and three. Participants were also more likely to have had further education. It is possible that the items in the CFQ may lack simplicity and thus those with higher levels of education may have been more predisposed to take part in the study. Attempts were made to contact individuals with lower levels of education, however, this did not prove fruitful. In addition, increased effort was also made to recruit male participants for studies two and three. Data from the depression subscale was found to be significantly skewed in a positive direction at both times of testing, indicating that depression symptoms were low in this sample. This is likely to be due to the healthy adult sample used in these studies where anxiety symptoms are more likely to vary as individuals tend to experience stress more frequently than changes in mood.

The management of missing data followed guidance from the research literature, however, it remains the case that removal of outliers and the use of mean imputation to replace missing data may have biased the results (Hawthorne & Elliot, 2005). As mentioned above, some researchers have found the use of individual mean imputation to work well and recommend this approach over others (Shrive *et al.,* 2006). Multiple imputation has also been recommended (Schafer & Graham, 2002), however, Shrive *et al.* (2006) have suggested that this technique can be confusing and difficult to understand. In the current study, relatively little data was missing and cases where more than 10 percent of responses was missing were excluded from the analysis. It is thus unlikely that the data was significantly affected by the methods used to handle the missing data.

These studies may be limited by the other questionnaires they used. Each of the other questionnaires have their own short comings. For example, the factor structure of the

HADS has been queried as some researchers suggest it taps into three factors rather than two (McCue *et al.,* 2006; Dunbar *et al.,* 2000). Other researchers query the extent to which anxiety and depression symptoms are distinct and whether it is appropriate to assess them as separate constructs (Bjelland *et al.,* 2002). The factor structure of the BIDR has also been questioned and Leite and Beretvas (2005) have suggested that "researchers should be careful when attempting to correct scores of other scales based on social desirability scores" (p.152). When stating this, they referred both to the BIDR and another measure of social desirability.

The FFMQ is still a relatively new measure and has not been fully assessed itself, although it is a development of an earlier measure, the Kentucky Inventory of Mindfulness Skills (KIMS) (Baer *et al.,* 2004). As mentioned in the introduction section, Van Dam *et al.* (2009) have highlighted that the FFMQ operates differently in individuals who meditate compared to those who do not. Further to this, these researchers have suggested that those who score more highly on mindfulness in this measure may actually just be more aware that their attention has wandered, rather than being more mindful. They have proposed that the fact that meditators score more highly does not necessarily mean they are more mindful, rather they may respond differently to the questions and thus the items on the FFMQ "function differently" between those who meditate and those who do not (Van Dam *et al.,* 2009, p.516). Van Dam *et al.* (2009) stated that this weakens the FFMQ's construct validity. This is similar to a statement made by Petersen and Zettle (2009) regarding the AAQ (first version) who suggested that the questions asked by this measure "may become at least somewhat transparent to those who have even minimal exposure to ACT" (p.532). Participants may thus become aware of how they may be expected to respond. The selection of questionnaires for the present studies was based on earlier research and are believed to have been the best measures available for the current purposes.

A further potential limitation of the current study concerns the use of online questionnaires. It has been suggested by some researchers that completing

questionnaires online may inflate the results (Andersson *et al.,* 2003; Buchanan, 2003). This may be due to the increased anonymity brought by this method which reduces the influence of social desirability (McCue *et al.,* 2006). Buchanan (2003) has emphasised that measures may change when put online and it is uncertain if they retain their reliability, validity and factor structure. As the current study has used predominantly an online version of the CFQ it may be wise to exercise caution when using the paper format. This study may also have been limited by mixing the formats of participation and it may be necessary to replicate this study using the paper form. The study by Dempster (2009), however, used mainly paper forms. The fact that comparable results have been found between the current study and that by Dempster (2009) suggests that the online version of the CFQ performs in a similar manner to the paper format.

If online questionnaire scores are inflated and if this is due to increased anonymity, it is possible that this criticism may not be applied to the current study as participants were requested to provide their email addresses. Although this was optional, it must be noted that the majority of participants did consent to being contacted again and recorded their email address. Further to this, the current study focused on the relationships (if any) between measures. If it is true that questionnaire scores are influenced by online participation, it is likely that all of the questionnaires will be affected by this. Alternatively, the inclusion of participants who did not provide contact details with those who did may have negatively impacted upon the results as some responses may be inflated while others were not.

From an alternative perspective, Andersson *et al.* (2003) found that scores yielded by an online version of the HADS were similar to those produced from paper and pencil forms. These researchers caution, however, that further consideration needs to be given about the scores required to identify clinical cases when this measure is completed. This was also suggested by Buchanan (2003) who suggested that different norms may need to be developed for online formats of measures. It must be emphasised that the use of the internet in research is still at an early stage (Andersson *et al.,* 2003). Online versions of

therapy such as CBT are used, therefore, it is necessary to consider how online forms of measures perform. In addition to this, Masuda *et al.* (2010) have suggested that computer based programmes may be helpful in reducing "variability" (p.16) in experimental conditions and can potentially reduce experimenter effects.

The use of a self-report format has inherent short comings in general which were discussed in the introduction section. In addition to this it may be particularly limiting when measuring a construct such as cognitive fusion. As mentioned in the introduction, cognitive fusion is believed to be influenced by context and self-report measures are unable to take this into consideration (Hayes *et al.*, 2004). Indeed, Hayes *et al.* (1987) has stated that "psychometrics evaluates assessment structurally, not functionally" (p.972). In support of this, Arch and Craske (2008) suggested that "behavioural and physiological measures" (p.267) are used rather than self-reports to measure cognitive fusion. They proposed that changes in avoidance in addition to changes in physiological response to distressing stimuli could be measured following a defusion intervention.

Further to this, the use of a test-retest analysis to measure reliability of the CFQ may not have been the most appropriate method for this purpose. As detailed in the introduction section, cognitive fusion is not permanent (Blackledge, 2007). Although some people are likely to experience it more often than others, given that fusion is influenced by context and thus is likely to fluctuate between settings (Hayes *et al.*, 2006), it is perhaps inappropriate to expect it to remain constant over time. Further assessment of the reliability of the CFQ may be beneficial using a different method of analysis such as split-half reliability, although study three used Cronbach's alpha to measure the internal consistency of the CFQ and found it to be high. Barker *et al.* (2002) have stated that split-half reliability has been "replaced by Cronbach's alpha" (p.62).

A final limitation of the CFQ may be perceived in its relation to anxiety symptoms. As mentioned, the CFQ was found to positively correlate with the anxiety subscale of the HADS. It could be argued that this may indicate that the CFQ is a measure of general

worry or stress rather than a measure of cognitive fusion. It is perhaps difficult to separate out cognitive fusion from anxiety, given that fusion is believed to play a role in anxiety symptoms as suggested by the mediation analysis in the current study. It is possible, however, that if the CFQ were to be a measure of worry that it should have correlated even more highly with the HADS subscales. In addition to this, it is unlikely that including the CFQ scores in the mediation analysis of anxiety symptoms between time one and time two would have accounted for any of the variance if the CFQ was a measure of anxiety symptoms.

4.5 Future Research

This leads to a consideration of future possibilities for the CFQ. The continued focus on the development of the CFQ will allow for cognitive fusion to be isolated within the ACT model and allow for its specific contribution to psychopathology, human suffering and change to be measured. It may help identify whether cognitive fusion is involved in the development and maintenance of mental health problems as believed (Hayes *et al.*, 1999) and whether there are particular disorders it is more likely to operate in. As mentioned in the introduction section, the ACT model consists of six interrelated processes one of which is cognitive defusion (Hayes *et al*., 2006). In developing a measure of cognitive fusion, the process of defusion is considered separately to the other processes. It was argued in the introduction section that this would allow for the measurement of the contribution this process makes in terms of the model and therapeutic change. It would also allow for defusion to be considered in greater detail and how it may be distinct from other constructs such as decentring.

From an alternative perspective, it is possible that separating out the processes of ACT is inadvisable due to their linked nature and the belief that they have a combined effect. It may not be possible to fully separate these processes (McCracken & Vowles, 2008). Indeed, McCracken and Vowles (2008) stated that "there is a need to continue to study the ACT model as a whole, with each of its constituent parts considered together" (p.405). From a similar perspective, Baer *et al.* (2004) also suggested that the KIMS

may separate mindfulness out when it is actually a "more integrated phenomenon" (p.204). This could be equally true of defusion and the ACT model and while it is useful to consider defusion in isolation, it may also be fruitful to study it in relation to the other ACT processes.

The close relationship between experiential avoidance and cognitive fusion as discussed above may mean that it is difficult to separate these processes. Greco *et al.* (2008) developed a questionnaire for young people measuring both avoidance and cognitive fusion. Items in this measure were developed from the AAQ, itself a measure of experiential avoidance (Hayes *et al.*, 2004). Further research will be required to establish whether it is more helpful to assess psychological flexibility as a whole or whether there is benefit in measuring each process contributing to flexibility separately. The functional contextualism approach which underlies ACT and RFT considers events within their context and environment and from this perspective it may be unhelpful to break such events down into their separate parts (Hayes *et al.*, 1999). When considering the Chronic Pain Acceptance Questionnaire, McCracken (2010) highlighted the "scientific instinct" (p.420) to break things down to a more simple understanding. McCracken (2010) has emphasised the functional contextualism approach in respect of acceptance and stated that "acceptance is not solely a pattern of overt action nor certainly a process solely based in cognition or belief. It is a process within interactions between action and experiences, including those contacted directly and those structured by thinking and believing" (p.420). While it is useful to consider cognitive defusion and acceptance separately in order to provide a fuller understanding of them, they are both understood to be aspects of psychological flexibility and it may be useful to consider them in this way. Further comparison of the CFQ and AAQ-II will be beneficial in this respect and the use of both measures in clinical studies may help this.

As discussed in study three above, the factor analysis has suggested that the CFQ is measuring cognitive fusion and cognitive defusion. It must be emphasised, however, that these are assumptions based upon the data. The factor analysis indicates which

behaviours (i.e. self-reports of relating to cognitive events in certain ways) group together and from a psychometric methods perspective, it is assumed from this that the underlying constructs are fusion and defusion. Such constructs cannot, however, be directly observed. The functional contextualism philosophy has a different approach towards latent constructs (Wilson *et al.*, 2010). Instead, it perceives self-report measures as representing behaviours that are related to each other and can be grouped as 'fusion' and 'defusion' but that these verbal terms must not be taken too seriously, resulting in them becoming more than what they represent (Wilson *et al.,* 2010). This can be understood from the position of RFT, whereby language becomes problematic when verbal labels assume the properties of what they represent (Blackledge, 2007). For the purposes of research, it is beneficial to have psychometrically sound measures, however, as discussed by Hayes *et al.* (1987), measures also need to have clinical utility. If the verbal labels of 'fusion' and 'defusion' are held "lightly" as encouraged by Hayes *et al.* (1999, p.281), it is possible that the CFQ can have clinical utility in addition to demonstrating good psychometrics.

The CFQ may be used in clinical settings where it can be used during assessment and to measure change throughout therapy (Hesser, 2009). The short length of the CFQ makes it particularly appropriate for these purposes. It can be used as a guide for treatment and to identify whether work on cognitive defusion is required and may also be used to highlight individual progress. The CFQ could also be used during single case experimental studies to help implement evidence based practice and explore the impact of new interventions. In addition to this, the developers of ACT have emphasised that both patients and therapists will be affected by experiential avoidance, cognitive fusion and the limitations of the verbal world and they encourage therapists to practice ACT techniques in their own lives (Hayes *et al.,* 1999). The CFQ could thus be used during ACT training in order that therapists learn from their own experiences with ACT. The usefulness of this application of ACT to trainee therapist's own lives could be considered by comparing training experiences which do include experiential components

with those that do not. The CFQ could thus be used as part of the measurement of this comparison.

The development of the CFQ may also help to identify the potential differences and similarities between ACT and other forms of psychological therapy. As mentioned in the introduction section, ACT and CBT are frequently compared (Hofman & Asmundson, 2008). It is possible that the CFQ may be used in studies comparing these two therapies to further explore their similarities and differences. Measures of cognitive content also exist, such as the Automatic Thought Questionnaire (Hollon & Kendall, 1980) and the Dysfunctional Attitude Scale (Beck *et al.*, 1991) and these could be used in such a study in addition to the CFQ. Potential changes in cognitive fusion and cognitive content could then be measured in relation to both forms of therapy to further consider the processes and mechanisms by which these therapies work (Arch & Craske, 2008). The development of the CFQ has made this possible. ACT could also be compared with other third wave therapies such as MBCT and DBT and the use of the CFQ may identify whether cognitive defusion is also part of these other therapies.

As detailed in the introduction section, it has yet to be identified which defusion strategies are the most effective (Masuda *et al.* 2004). The CFQ could be used to measure cognitive fusion levels both prior to and following the implementation of specific defusion techniques to help this process. It may then be possible to recommend certain strategies to manage cognitive fusion. In attempting to explore the relationship and similarities between defusion and other constructs, the current study focused on the relationship between the CFQ and a measure of mindfulness. As detailed in the introduction section, defusion also shares similarities with believability (Healy *et al.,* 2008) and in particular, decentring (Teasdale *et al.,* 2002). It is likely that the CFQ will also correlate with measures of decentring, such as the Experiential Questionnaire (Fresco, Moore *et al.*, 2007).

The use of ACT as an intervention for individuals from non-Western cultures was referred to above in the case study reported by Murrell *et al.* (2009). If this is to be developed, it will be necessary for the CFQ to be developed for use within other cultures and for ethnic minorities. Greco *et al.* (2008) encouraged this in relation to the development of their own questionnaire. ACT may be particularly applicable for use with individuals from other cultures given the importance it places upon language and context and its behavioural analytic background (Murrell *et al.,* 2009). Indeed, the CFQ is currently being translated into Japanese, French, German, Dutch, Portuguese and Hebrew versions (Gillanders, personal correspondence, 14 June 2010).

5 CONCLUSION

The current studies have found that the CFQ demonstrates good test-retest reliability. It has been found to correlate in the theoretically predicted directions with measures of mindfulness, experiential avoidance anxiety and depression. It also appears to be unaffected by deliberate attempts to appear more socially desirable although individuals who score highly on self-deception may respond with lower scores on the CFQ. Finally, the CFQ has been demonstrated to have a two factor structure. These studies had some limitations and further assessment of the CFQ is required. The development of the CFQ may be of benefit both clinically and within research.

Throughout their studies, ACT researchers have emphasised that "the problem is not the presence of particular thoughts, emotions, sensations or urges: It is the constriction of a human life. The solution is not removal of difficult private events: It is living a valued life" (Hayes & Wilson, 2003, p.165). It is hoped that the development of the CFQ can contribute to an increase in valued living through research and therapy.

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APPENDIX A

Cognitive Fusion Questionnaire

CFQ13

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 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
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 over-analyse situations to the point where it's unhelpful to me	1	2	3	4	5	6	7
5. I struggle with my thoughts	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 need to control the thoughts that come into my head	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 tend to react very strongly to my thoughts	1	2	3	4	5	6	7
12. 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
13. 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

APPENDIX B

Hospital Anxiety and Depression Scale

Read each item below and underline the reply which comes closest to how you have been feeling in the past week. Don't take too long over your replies, your immediate reaction to each item will probably be more accurate than a long, thought-out response.

I feel tense or 'wound up'
- Most of the time
- A lot of the time
- From time to time, occasionally
- Not at all

I still enjoy the things I used to enjoy
- Definitely as much
- Not quite so much
- Only a little
- Hardly at all

I get a sort of frightened feeling as if something awful is about to happen
- Very definitely and quite badly
- Yes, but not too badly
- A little, but it doesn't worry me
- Not at all

I can laugh and see the funny side of things
- As much as I always could
- Not quite so much now
- Definitely not so much now
- Not at all

Worrying thoughts go through my mind
- A great deal of the time
- A lot of the time
- Not too often
- Very little

I feel cheerful
- Never
- Not often
- Sometimes
- Most of the time

I can sit at ease and feel relaxed
- Definitely
- Usually
- Not often
- Not at all

I feel as if I am slowed down
- Nearly all the time
- Very often
- Sometimes
- Not at all

I get a sort of frightened feeling like 'butterflies' in the stomach
- Not at all
- Occasionally
- Quite often
- Very often

I have lost interest in my appearance
- Definitely
- I don't take as much care as I should
- I may not take as much care
- I take just as much care as ever.

I feel restless as if I have to be on the move
- Very much indeed
- Quite a lot
- Not very much
- Not at all

I look forward with enjoyment to things
- As much as I ever did
- Rather less than I used to
- Definitely less than I used to
- Hardly at all

I get sudden feelings of panic
- Very often indeed
- Quite often
- Not very often
- Not at all

I can enjoy a good book or radio or television programme
- Often
- Sometimes
- Not often
- Very seldom

APPENDIX C

Five Facet Mindfulness Questionnaire

Please rate each of the following statements using the scale provided. Write the number in the blank that best describes <u>your own opinion</u> of what is <u>generally true for you</u>.

1	2	3	4	5
never or very rarely true	**rarely true**	**sometimes true**	**often true**	**very often or always true**

_____ 1. When I'm walking, I deliberately notice the sensations of my body moving.
_____ 2. I'm good at finding words to describe my feelings.
_____ 3. I criticize myself for having irrational or inappropriate emotions.
_____ 4. I perceive my feelings and emotions without having to react to them.
_____ 5. When I do things, my mind wanders off and I'm easily distracted.
_____ 6. When I take a shower or bath, I stay alert to the sensations of water on my body.
_____ 7. I can easily put my beliefs, opinions, and expectations into words.
_____ 8. I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted.
_____ 9. I watch my feelings without getting lost in them.
_____ 10. I tell myself I shouldn't be feeling the way I'm feeling.
_____ 11. I notice how foods and drinks affect my thoughts, bodily sensations, and emotions.
_____ 12. It's hard for me to find the words to describe what I'm thinking.
_____ 13. I am easily distracted.
_____ 14. I believe some of my thoughts are abnormal or bad and I shouldn't think that way.
_____ 15. I pay attention to sensations, such as the wind in my hair or sun on my face.
_____ 16. I have trouble thinking of the right words to express how I feel about things
_____ 17. I make judgments about whether my thoughts are good or bad.
_____ 18. I find it difficult to stay focused on what's happening in the present.
_____ 19. When I have distressing thoughts or images, I "step back" and am aware of the thought or image without getting taken over by it.
_____ 20. I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing.
_____ 21. In difficult situations, I can pause without immediately reacting.
_____ 22. When I have a sensation in my body, it's difficult for me to describe it because I can't find the right words.

1	2	3	4	5
never or very rarely true	**rarely true**	**sometimes true**	**often true**	**very often or always true**

_____ 23. It seems I am “running on automatic” without much awareness of what I’m doing.
_____24. When I have distressing thoughts or images, I feel calm soon after.
_____ 25. I tell myself that I shouldn’t be thinking the way I’m thinking.
_____ 26. I notice the smells and aromas of things.
_____ 27. Even when I’m feeling terribly upset, I can find a way to put it into words.
_____ 28. I rush through activities without being really attentive to them.
_____ 29. When I have distressing thoughts or images I am able just to notice them without reacting.
_____ 30. I think some of my emotions are bad or inappropriate and I shouldn’t feel them.
_____ 31. I notice visual elements in art or nature, such as colors, shapes, textures, or patterns of light and shadow.
_____ 32. My natural tendency is to put my experiences into words.
_____ 33. When I have distressing thoughts or images, I just notice them and let them go.
_____ 34. I do jobs or tasks automatically without being aware of what I’m doing.
_____ 35. When I have distressing thoughts or images, I judge myself as good or bad, depending what the thought/image is about.
_____ 36. I pay attention to how my emotions affect my thoughts and behavior.
_____ 37. I can usually describe how I feel at the moment in considerable detail.
_____ 38. I find myself doing things without paying attention.
_____ 39. I disapprove of myself when I have irrational ideas.

APPENDIX D

Balanced Inventory of Desirable Responding

Using the scale below as a guide, write a number beside each statement to indicate how much you agree with it.

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5 ---------- 6 ----------7

Not True | Somewhat True | Very True

_____ 1. My first impressions of people usually turn out to be right.
_____ 2. It would be hard for me to break any of my bad habits.
_____ 3. I don't care to know what other people really think of me.
_____ 4. I have not always been honest with myself
_____ 5. I always know why I like things.
_____ 6. When my emotions are aroused, it biases my thinking.
_____ 7. Once I've made up my mind, other people can seldom change my opinion.
_____ 8. I am not a safe driver when I exceed the speed limit.
_____ 9. I am fully in control of my own fate.
_____ 10. It's hard for me to shut off a disturbing thought.
_____ 11. I never regret my decisions.
_____ 12. I sometimes lose out on things because I can't make up my mind soon enough.
_____ 13. The reason I vote is because my vote can make a difference.
_____ 14. My parents were not always fair when they punished me.
_____ 15. I am a completely rational person.
_____ 16. I rarely appreciate criticism.
_____ 17. I am very confident of my judgments.
_____ 18. I have sometimes doubted my ability as a lover.
_____ 19. It's all right with me if some people happen to dislike me.
_____ 20. I don't always know the reasons why I do the things I do.
_____ 21. I sometimes tell lies if I have to.
_____ 22. I never cover up my mistakes.
_____ 23. There have been occasions when I have taken advantage of someone.
_____ 24. I never swear.
_____ 25. I sometimes try to get even rather than forgive and forget.
_____ 26. I always obey laws, even if I'm unlikely to get caught.
_____ 27. I have said something bad about a friend behind his or her back.
_____ 28. When I hear people talking privately, I avoid listening.
_____ 29. I have received too much change from a salesperson without telling him or her.

Using the scale below as a guide, write a number beside each statement to indicate how much you agree with it.

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5 ---------- 6 ----------7

Not True | Somewhat True | Very True

_____ 30. I always declare everything at customs.

_____ 31. When I was young I sometimes stole things.

_____ 32. I have never dropped litter on the street

_____ 33. I sometimes drive faster than the speed limit

_____ 34. I never read sexy books or magazines.

_____ 35. I have done things that I don't tell other people about.

_____ 36. I never take things that don't belong to me.

_____ 37. I have taken sick-leave from work or school even though I wasn't really sick.

_____ 38. I have never damaged a library book or store merchandise without reporting it.

_____ 39. I have some pretty awful habits.

_____ 40. I don't gossip about other people's business.

APPENDIX E

Acceptance and Action Questionnaire, second version

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 F

Response from NHS Ethics

From: Res Nos (NHS Grampian)
Sent: 10 June 2009 13:48
To: Campbell Lindsey (NHS Grampian)
Subject: RE: Ethics

Hi Lyndsey

At this stage, we would need you to confirm that no NHS staff, patients or premises would be involved in you study at present. If this is the case, then this is outside our remit even though you are an NHS employee.

You should be aware that you may have a duty of care towards participants which you would need to address, particularly if participants score highly on the HADS questionnaire. You may wish to address this prior to submitting to the Edinburgh University Ethics Committee.

I hope this is helpful.

Carol
Acting Scientific Officer
North of Scotland Research Ethics Service
Summerfield House
2 Eday Road
Aberdeen
AB15 6RE

Tel: 01224 558474

Office Hours: Mon-Fri 9am - 4pm

APPENDIX G

Response from University of Edinburgh Ethics Panel

UNIVERSITY OF EDINBURGH / NHS (SCOTLAND) CLINICAL PSYCHOLOGY TRAINING COURSE

Research Ethics Meeting 7th September 09

Present:
Ethel Quayle
Emily Newman
Dave Peck
Lindsey Murray
Jill Cossar

Apologies:
Suzanne O'Rourke

Lindsey Campbell

This was felt to be a potentially interesting study which builds on research within the Programme. There was, however, some concern that this study has similarities with Maria Dempster's study and that there may be a considerable overlap in the literature reviewed. This concern should be addressed along with the following points. The Committee does not require resubmission of the proposal.

Research design.

- The research question should be amended to talk about test-retest reliability.
- The secondary research questions are unclear, especially with relevance to validity. Please clarify.
- The procedure in terms of how the participants will be recruited, how the web interface will be set up and its access all need to be clarified.
- There appear to be inconsistencies in the proposal in the number of items on the CFQ. In addition, the number of subjects seems to be predicated on a version of this measure that will not be used in the proposed study. This needs to be better explained.
- It is unclear why there is a reference to ACT within the proposal. What relevance does this have to the proposed study?

Ethics

- The language of both the proposal, but also the Information Sheet, needs to be both simplified and clarified. This specifically relates to the title of the study.
- It would be important to ascertain whether this requires NHS ethics approval.
- There is a possible underestimate in the amount of time it will take to complete these questionnaires?

APPENDIX H

Study One Participant Information

The University of Edinburgh

Welcome

Measuring Thinking Styles

Information for Potential Participants

Purpose of the study

This research is being carried out to measure a certain aspect of how people think. Unhelpful thinking styles are known to be important in the development of a range of psychological problems including anxiety and mood problems. This study is part of a series of studies being run in different parts of the United Kingdom to develop a good quality questionnaire of certain ways of thinking. We need to ask a lot of people to complete the questionnaire in order to know if it is a good measure of this thinking style. This thinking style is present in people who have psychological problems and those who don't, which is why you have been asked to participate. In addition to this, we plan to assess how this questionnaire relates to other aspects of thoughts and emotions which are measured by other questionnaires.

This study is being undertaken for educational purposes and will in part contribute towards a doctorate degree in clinical psychology in conjunction with the University of Edinburgh. 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 page). Please ask if there is anything you are unclear about or if you would like more information.

Why have I been approached?

I am seeking participants who are aged 18 and over and whose first language is English.

Do I have to take part?

No. Participation is entirely voluntary. You can choose to withdraw at any time.

What does participation involve?

I am aiming to measure how stable one of these questionnaires remains over time and how it relates to other questionnaires. Therefore, I would appreciate your participation on two occasions, one month apart. Participation should take about 25 minutes on the first occasion and only 10 minutes on the second occasion. There are fewer questionnaires included at the second time of participation. Some of the questions may seem quite repetitive as the questionnaires are quite similar and they use different ways of asking similar things. You can save your results at any time and return to them later.

When you begin participation you will be asked for your email address in order that I can contact you a month later to ask you to complete some of the questionnaires again. Submitting your email address implies that you consent to being contacted by myself one month later. You will not be contacted again following this. If you do not wish to participate again on the second occasion, leave the space requesting your email address blank and continue with the rest of the questions.

What happens to my results?
Your questionnaire results will be stored securely by the University of Edinburgh computing services until the survey closes (approximately May 2010). The two University of Edinburgh administrators of the site can access some of your results but your email address is only accessible by myself as the results have been filtered. No-one else will be able to access your results. Following the closure of the survey, the details I hold of your email address will be destroyed and you will not be contacted again. Your email address and results will be kept confidential at all times. On the second participation occasion you will be provided with a unique identifying number so that you will not need to re-enter your email address. The anonymised results will be submitted to the University of Edinburgh as part of my doctoral thesis. I may also decide to publish the results, however, at no time will your email address be disclosed to anyone else.

What are the possible benefits of taking part?
Your participation will help with the development of this questionnaire. It will identify whether this questionnaire is reliable over time and how it relates to other questionnaires which measure other aspects of thoughts and emotions. When further developed, this questionnaire may be used to measure the level of change in people who are undergoing psychological therapy.

Who can I contact?

If you have been affected by anything in the survey then please feel free to contact the Study Researcher.

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

Miss Lindsey Campbell
Study Researcher
L.Campbell-13@sms.ed.ac.uk

Dr David Gillanders
Research Supervisor
dgilland@staffmail.ed.ac.uk

School of Health in Social Science
Medical School
University of Edinburgh
Teviot Place, Edinburgh, EH8 9AG

If you wish to take part: Please click on CONTINUE to start answering the questions. There are 6 sections to be completed.

If you do not wish to take part: I would like to thank you for taking the time to read through this information sheet. You can now close this page.

The survey can be saved and returned to at any time and takes around 25 minutes to compete.

Note that once you have clicked on the CONTINUE button at the bottom of each page you cannot return to review or amend that page.

APPENDIX I

Study Two Participant Information online version

The University of Edinburgh

Welcome

Measuring Thinking Styles

Information for Participants

Purpose of the study

This research is being carried out to measure a certain aspect of how people think. Unhelpful thinking styles are known to be important in the development of a range of psychological problems including anxiety and mood problems. This study is part of a series of studies being run in different parts of the United Kingdom to develop a good quality questionnaire of certain ways of thinking. We need to ask a lot of people to complete the questionnaire in order to know if it is a good measure of this thinking style. This thinking style is present in people who have psychological problems and those who don't, which is why you have been asked to participate. In addition to this, we plan to assess how this questionnaire relates to certain aspects of emotions which are measured by another questionnaire.

This study is being undertaken for educational purposes and will in part contribute towards a doctorate degree in clinical psychology in conjunction with the University of Edinburgh. 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 page). Please ask if there is anything you are unclear about or if you would like more information.

Why have I been approached?

I am seeking participants who are aged 18 and over and whose first language is English.

Do I have to take part?

No. Participation is entirely voluntary. You can choose to withdraw at any time.

What does participation involve?

I am aiming to measure how stable one of these questionnaires remains over time and how it relates to another questionnaire. Therefore, I would appreciate your participation on two occasions, one month apart. Participation should take no more than 10 minutes on each occasion. You can save your results at any time and return to them later.

When you begin participation you will be asked for your email address in order that I can contact you a month later to ask you to complete some of the questionnaires again. Submitting your email address implies that you consent to being contacted by myself

one month later. You will not be contacted again following this. If you do not wish to participate again on the second occasion, leave the space requesting your email address blank and continue with the rest of the questions.

What happens to my results?
Your questionnaire results will be stored securely by the University of Edinburgh computing services until the survey closes (approximately May 2010). The two University of Edinburgh administrators of the site can access some of your results but your email address is only accessible by myself as the results have been filtered. No-one else will be able to access your results. Following the closure of the survey, the details I hold of your email address will be destroyed and you will not be contacted again. Your email address and results will be kept confidential at all times. On the second participation occasion you will be provided with a unique identifying number so that you will not need to re-enter your email address. The anonymised results will be submitted to the University of Edinburgh as part of my doctoral thesis. I may also decide to publish the results, however, at no time will your email address be disclosed to anyone else.

What are the possible benefits of taking part?
Your participation will help with the development of this questionnaire. It will identify whether this questionnaire is reliable over time and how it relates to another questionnaire which measures aspects of emotions. When further developed, this questionnaire may be used to measure the level of change in people who are undergoing psychological therapy.

Who can I contact?

If you have been affected by anything in the survey then please feel free to contact the Study Researcher.

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

Miss Lindsey Campbell
Study Researcher
L.Campbell-13@sms.ed.ac.uk

Dr David Gillanders
Research Supervisor
dgilland@staffmail.ed.ac.uk

School of Health in Social Science
Medical School
University of Edinburgh
Teviot Place
Edinburgh
EH8 9AG

If you wish to take part: Please click on CONTINUE to start answering the questions.

There are 3 sections to be completed.

If you do not wish to take part: I would like to thank you for taking the time to read through this information sheet. You can now close this page.

The survey can be saved and returned to at any time and takes about 10 minutes to compete.

Note that once you have clicked on the CONTINUE button at the bottom of each page you cannot return to review or amend that page.

APPENDIX J

Study Two Participant Information – paper version

The University of Edinburgh

Measuring Thinking Styles

Information for Potential Participants

I am undertaking a Doctorate in Clinical Psychology and as part of my research, I would like to invite you to complete my survey on thinking styles. Completion of the survey should take approximately 10 minutes. Please read on for further information.

Purpose of the study

This research is being carried out to measure a certain aspect of how people think. Unhelpful thinking styles are known to be important in the development of a range of psychological problems including anxiety and mood problems. This study is part of a series of studies being run in different parts of the United Kingdom to develop a good quality questionnaire of certain ways of thinking. We need to ask a lot of people to complete the questionnaire in order to know if it is a good measure of this thinking style. This thinking style is present in people who have psychological problems and those who don't, therefore we are seeking a wide variety of people to complete the questionnaire. In addition to this, we plan to assess how this questionnaire relates to aspects of emotions which are measured by another questionnaire.

This study is being undertaken for educational purposes and will in part contribute towards a doctorate degree in clinical psychology in conjunction with the University of Edinburgh. 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.

Why have I been approached?

I am seeking participants who are aged 18 and over and whose first language is English.

Do I have to take part?

No. Participation is entirely voluntary. You can choose to withdraw at any time.

What does participation involve?

If you would like to take part then you will be asked to complete the attached questionnaires. I am aiming to measure how stable one of these questionnaires remains over time and how it relates to another questionnaire. Therefore, I would appreciate your participation on two occasions, one month apart. Participation should take no longer than 10 minutes on each occasion and you will be asked to complete the same questionnaires on each occasion.

You will be asked to provide your name and address in order that I can contact you a month later with the second copy of the questionnaires. Providing your name and address implies that you consent to being contacted by me one month later. You will not be contacted again following this. If you do not wish to participate again on the second occasion, leave the space requesting your name and address blank and continue with the rest of the questions.

What happens to my results?
Your questionnaire results will be stored confidentially and will only be accessible by myself. Following completion of the questionnaires, I will remove your name and address from your results and use a unique number to identify them with. Your name and address will be stored separately from your results. Following your participation on the second occasion, the details I hold of your name and address will be destroyed and you will not be contacted again. **Your name, address and results will be kept confidential at all times.** The anonymised results will be submitted to the University of Edinburgh as part of my doctoral thesis. I may also decide to publish the results, however, at no time will your name or address be disclosed to anyone else.

What are the possible benefits of taking part?
Your participation will help with the development of this questionnaire. It will identify whether this questionnaire is reliable over time and how it relates to another questionnaire which measures aspects of emotions. When further developed, this questionnaire may be used to measure the level of change in people who are undergoing psychological therapy.

If you wish to take part: Please complete the attached questionnaires (within one month) and return them in the stamped addressed envelope. There are 3 sections to be completed and this should take about 10 minutes.

If you do not wish to take part: I would like to thank you for taking the time to read through this information sheet. You need do nothing more.

Who can I contact?
If you have been affected by anything in the questionnaires then please feel free to contact the Study Researcher below. If you have any queries about any aspect of the study or require further information, please do not hesitate to contact us at the address given below:

Miss Lindsey Campbell
Study Researcher
Clinical Psychology Department
School of Health in Social Science
Medical School
University of Edinburgh
Teviot Place
Edinburgh
EH8 9AG

L.Campbell-13@sms.ed.ac.uk

Dr David Gillanders
Research Supervisor
Clinical Psychology Department
School of Health in Social Science
Medical School
University of Edinburgh
Teviot Place
Edinburgh
EH8 9AG

dgilland@staffmail.ed.ac.uk

APPENDIX K

Email sent in response to high HADS scores

The University of Edinburgh

Dear Participant

During your participation in the research project measuring thinking styles, you indicated that you wished to be contacted if you had high scores on a screening questionnaire measuring symptoms of anxiety and depression. I am writing to inform you that you did score more highly than the general population on the anxiety/depression aspect of this questionnaire.

It is important to note that this questionnaire is a screening measure and does not diagnose anxiety or depression. People can score highly on this questionnaire for a number of reasons and your scores do not necessarily indicate that you are clinically anxious or depressed.

It may be helpful for you to access the following websites to read more about anxiety and/or depression:

Anxiety
http://www.rcpsych.ac.uk/mentalhealthinfoforall/problems/anxietyphobias/anxietyphobias.aspx

Depression
http://www.rcpsych.ac.uk/mentalhealthinformation/mentalhealthproblems/depression.aspx

After reading this information, if you feel you require more help with your symptoms then please contact your General Practitioner at the practice you are registered with.

I hope you find this information helpful.

Yours faithfully

Lindsey Campbell
Study Researcher
s0792451@sms.ed.ac.uk

APPENDIX L

Email sent to recruit participants

Dear Recipient

I am undertaking a Doctorate in Clinical Psychology and as part of my research, I would like to invite you to complete my survey on thinking styles. Completion of the survey should take approximately 10 minutes. Please access the link below for further information on the survey.

https://www.survey.ed.ac.uk/thinkingstylesstudy2/

I am hoping to recruit as many participants as possible. If you know of anyone else who might be willing to take part, please forward this email to them. Thank you for your help.

Lindsey Campbell
Study Researcher

Clinical Psychology Department
School of Health in Social Science
Medical School
University of Edinburgh
Teviot Place
Edinburgh
EH8 9AG
L.Campbell-13@sms.ed.ac.uk

Appendix M

Email sent at testing time two

Dear Participant

You might remember that you agreed to participate in my research and completed some questionnaires about a month ago. At this time, you kindly provided me with your email address in order that I could contact you again to complete some further questionnaires. Participation should take no longer than 10 minutes. I would appreciate it if you could access the link below and complete the questionnaires. **When prompted, please enter your unique identifying number which is 123.**

https://www.survey.ed.ac.uk/thinkingstylesstudy2repeat/

This is the final time that I am requesting your participation. You will not be contacted by me again unless you request feedback.

Thank you for your help.

Lindsey Campbell
Study Researcher

Department of Clinical Psychology
School of Health in Social Science
Medical School
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