

VOLUME I

RESEARCH COMPONENT

Acceptance and Commitment Therapy:

Cognitive defusion and the Self

by

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Thesis Overview

This thesis consists of two volumes and has been submitted to the University of Birmingham towards the Doctorate in Clinical Psychology.

Volume I consists of three chapters. Chapter 1 is a systematic review of the literature exploring the available evidence on the effectiveness of cognitive defusion. Cognitive defusion was found to be an effective approach in improving chosen outcomes. Chapter 2 is an empirical research study exploring two processes of the psychological flexibility model of Acceptance and Commitment Therapy in people with persistent pain. The data showed that cognitive fusion and self-as-content were associated with psychological distress in this sample of people with persistent pain, as predicted by the model. Chapter 3 is a public dissemination document, which provides a brief and accessible overview of the systematic review and empirical study.

Volume II comprises of five clinical practice reports. The first clinical practice report presents the case of Darren*, a man with generalised anxiety. Formulations of Darren's anxiety are presented from a Cognitive Behavioural and Psychodynamic perspective. The second report is a service evaluation on the adherence to the NICE recommendations for psychosis in a local CMHT. The third report is a single-case experimental design exploring the effectiveness of a behavioural experiment with Beth*, a 75-year-old woman with anxiety. The fourth report is the case study of Alan*, a man with low self-esteem accessing a Clinical Health Psychology service. The fifth report presents an abstract of the oral presentation of the case study of Joe*, an adult with a Learning Disability and behaviour that challenges.

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CHAPTER I

LITERATURE REVIEW

DOES COGNITIVE DEFUSION WORK?

Abstract

Background: Acceptance and Commitment Therapy (ACT) is one of the, so called, Third Wave Therapies. ACT has a growing evidence base in improving outcomes and increasing psychological flexibility across clinical and non-clinical populations. ACT follows both a top down and a bottom up approach in research and explores the effectiveness of the different model components. Cognitive defusion, one of the cognitive techniques within the ACT model, refers to the process of detaching oneself from the content of one's thoughts and the control of this over one's behaviour. Cognitive defusion has been compared to therapeutic techniques of other therapy models.

Aim: The aim of the present systematic review is to explore the evidence on the effectiveness of cognitive defusion in improving outcomes, when compared to alternative therapy model components.

Method: Four databases were searched for relevant papers. 18 papers that met the inclusion and exclusion criteria were identified and included in the review. These were subjected to a quality framework to allow the comparative evaluation of the papers' strengths and weaknesses.

Results: Overall, cognitive defusion was found to be as effective as cognitive restructuring, thought suppression, imaginal exposure, guided imagery, and acceptance in improving study specific outcomes. Cognitive defusion was found to be more effective than thought distraction. Methodological limitations, clinical implications and recommendations for future research are discussed.

Conclusion: Cognitive defusion appears to be, at least as effective as other therapeutic approaches. However, methodological issues reduce confidence in the conclusions that can be drawn.

1. Introduction

1.1 Acceptance and Commitment Therapy

Acceptance and Commitment Therapy (ACT) is a therapy model developed by Stephen Hayes and colleagues (Hayes et al., 1999), and is considered one of the so called ‘third wave’ behaviour therapies (Hayes, 2004). Historically, the ‘first wave’ of psychological therapies differed from earlier psychological traditions in that an empirical grounding of clinical methods was seen, for the first time, as paramount (Hayes, 2004). Behaviour Therapy, developed in the 1950s (Ost, 2008), was at the heart of the ‘first wave’ and focused on target problem behaviours, classical conditioning and learning (Kahl et al., 2012). Cognitive Therapy followed as the ‘second wave’ in the 1970s, and was originally applied to depression, anxiety and eating disorders (Ost, 2008). Later, Behaviour Therapy and Cognitive Therapy came together to form, what we know today as, Cognitive Behaviour Therapy (CBT; Ost, 2008). The ‘third wave’ is an umbrella term referring to more than one psychological models. Although not an exhaustive list, some of these are: ACT, Mindfulness-Based Cognitive Therapy (MBCT), Dialectical Behavioural Therapy (DBT), and Functional Analytic Psychotherapy (FAP) (Dimidjian et al., 2016). There is no cohesive way of describing all the aforementioned models (Hayes, 2004); however, some commonalities include a shift of focus towards mindfulness, acceptance and dialectics (Kahl et al., 2012).

ACT is a strongly behavioural therapeutic model (Harris, 2009) and finds its theoretical basis in functional contextualism (Hayes, 2004). Functional contextualism suggests that the context in which an event occurs is fundamental in understanding the function of said event (Hayes, 2004). ACT moves away from traditional Western psychological models, which deem

private events (i.e. thoughts and emotions) as the cause of psychological suffering (Harris, 2006). ACT endorses the view that psychological suffering is part of human nature and, hence, unavoidable. Therefore, the context and function of private events are considered significant in understanding one's psychological difficulties (Harris, 2009). The aim of ACT is not to rid a person of their aversive private events, such as distressing thoughts or emotions, but to change the function of said events and the person's way of relating to these (Hayes et al., 2012), with the intention of increasing psychological flexibility.

1.2 ACT processes

ACT is a model of psychological flexibility (Bond et al., 2006). In ACT terms, psychological flexibility can be understood as one's ability to remain in contact with the present moment, whilst being aware of one's private experiences and pursuing value-oriented life goals (Luciano et al. 2017). According to ACT, six core psychological processes constantly interact in attaining psychological flexibility. These are contact with the present moment, acceptance, cognitive defusion, self-as-context, identifying values, and committed action. An overview of these can be seen in Figure 1.

Contact with the present moment refers to one's ability to be present in the here and now, mindfully aware of one's internal and external experiences in the present moment, whilst being willing to engage with these (Harris, 2009; Hayes, 2006).

Acceptance is about one's willingness to allow experiences, especially aversive private experiences, to exist. One does not try to control or change these but makes space for the experiences to be as they are (Harris, 2009; Hayes, 2006).

Cognitive defusion refers to the process of detachment from the content of one's thoughts.

This is about acknowledging that thoughts are words or sounds and, as such, one can learn to let them come and go without becoming entangled in their meaning (Harris, 2009; Hayes, 2006).

Self-as-context is the process leading to a transcendent sense of self, which is the container or context of all private events and experiences. This is also referred to as the 'observing self', the aspect of oneself that allows one to directly observe one's thoughts, feelings and physical sensations, whilst being aware that one is not identified with the content of these. One is the space in which one's private events take place (Harris, 2009; Hayes, 2006).

Identifying values is about discovering and naming one's chosen qualities and important life directions, so that one can lead a meaningful life. It is about what matters in one's life (Harris, 2009; Hayes, 2006).

Committed action or value-directed action refers to one taking effective action in life, which is guided by one's values. This may lead to unpleasant internal experiences surfacing and one allowing space for these so as to continue to pursue what matters (Harris, 2009; Hayes, 2006).

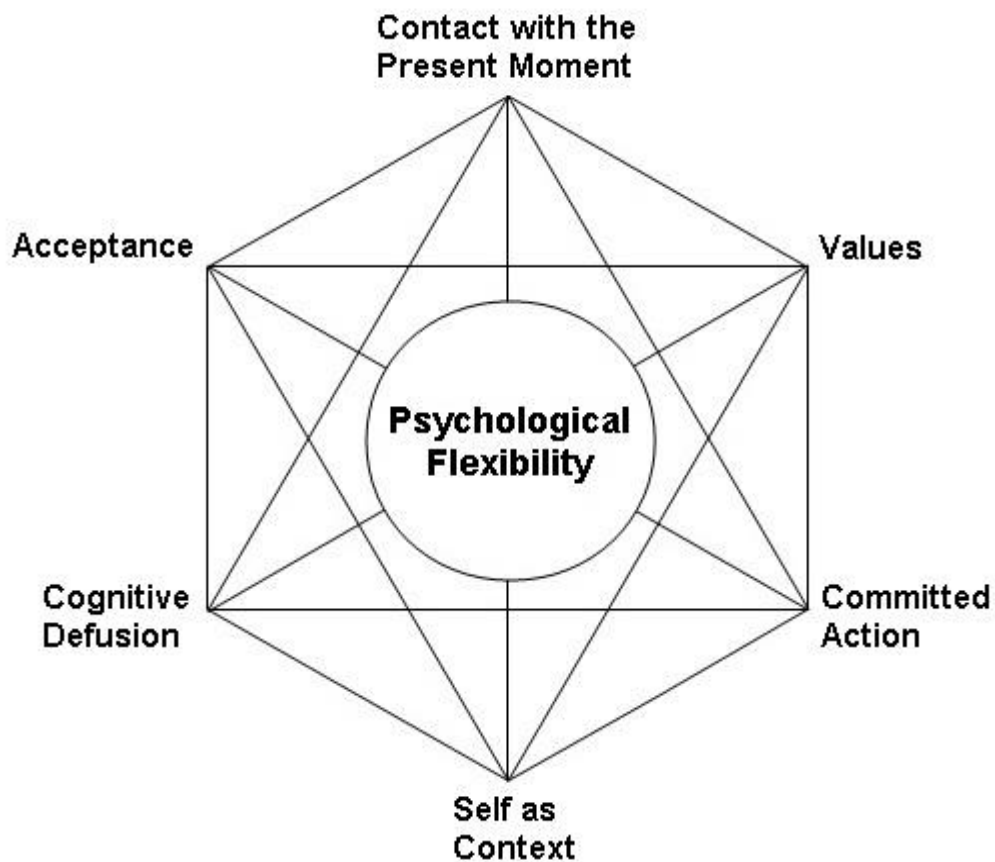


Figure 1. The ACT hexaflex (Harris, 2009).

1.3 Cognitive Defusion

Most people experience negative thoughts in their everyday lives. Despite the common nature of negative thoughts, they have been linked to a wide range of psychopathology, when considered to be intrusive and intense (Larsson et al., 2016). Traditionally, CBT has placed negative automatic thoughts, namely the content of negative automatic thoughts, at the core of psychological difficulties (Beck et al., 1979). Therefore, the content of negative automatic thoughts has become the target of techniques, within CBT, aimed at reducing psychological distress (Greenberger & Padesky, 1995).

Acceptance and Commitment therapy is also concerned with identifying negative thoughts, which are linked to one's psychological distress. Hayes (2004) describes 'third wave therapies', and ACT within these, as "particularly sensitive to the context and functions of psychological phenomena" (p.658). In contrast to CBT, however, ACT therapeutic interventions do not target the content of these thoughts but rather one's relationship to these. Cognitive defusion is one of the core ACT techniques used therapeutically to address this. Through cognitive defusion one can learn that thoughts are merely bits of language and, thus, one does not need to identify oneself with the content of negative thoughts. For instance, one may have the passing thought 'I am useless'. From an ACT perspective, the meaning of this thought is unimportant. What matters is the relationship that one develops to the meaning of this thought and the impact of this, as one can become attached to and entangled in this content. Cognitive defusion techniques would allow one to learn to regard this thought, as a mere sound, a 'story' (Harris, 2011) and a product of one's mind amongst many others. This way, one learns that one need not pay attention to this thought and can let go of its meaning. This helps create space between oneself and a distressing thought, and eventually change the contexts and functions of this thought (Luciano et al., 2014). Some defusion techniques include 'I'm having the thought that', 'rapid word repetition', 'thanking your mind', and 'silly voices' (Harris, 2009; Harris, 2011).

The effectiveness of cognitive defusion has been well researched since the development of the model. Cognitive defusion has been associated with decreased experienced distress and depressive symptoms and increased self-esteem (Hinton & Gaynor, 2010), and tolerance of psychological discomfort (Luciano et al., 2014). It has also been shown to have an impact on the believability of targeted negative thoughts (Masuda et al., 2009). More recently, Donald

et al. (2016) found cognitive defusion to be a likely predictor of one's coping style; that is, cognitive defusion is suggested to predict an approach rather than avoidance coping style.

Hayes (2006) explains that, within ACT research, the specific elements of the model are considered in a bottom-up, technique- building approach. That is, in parallel to providing evidence in support of the efficacy of the overall model, ACT researchers are engaged in studying the differential power of the model elements that mediate change. This approach facilitates scientific testing of whether ACT processes work as predicted by the model and provides a stronger evidence base for the use of the different therapeutic techniques.

1.4 Current Review

ACT, as a transdiagnostic therapeutic model, can be applied across a wide range of psychological difficulties and across clinical and non-clinical populations (Hayes, 2012; Levin et al., 2018). Clinical studies have shown the efficacy of ACT protocols in improving outcomes (Hacker et al., 2016) and increasing psychological flexibility (Gil-Luciano et al., 2017), which in turn can lead to further outcome improvements (Hinton & Gaynor, 2010). However, trials of comprehensive therapy protocols do not allow discrimination of which therapy components may be the main mediators of change (Yovel et al., 2014). In the current climate of cost effectiveness and the need for services to evidence outcomes within strict time limits, being able to determine which therapy components may be more efficacious than others in bringing change is of great importance (Yovel et al., 2014). There is both theoretical and practical value, therefore, in isolating therapy components and exploring their relative efficacy.

Within the ACT hexaflex, all six process are considered equally important in improving one's psychological flexibility. In terms of cognitive processes, cognitive defusion and self-as-context are two cognitive approaches unique to ACT. Cognitive defusion has been sufficiently researched, whereas self-as-context is one of the least studied processes of the hexaflex (Yu & McCracken, 2016). Cognitive defusion has been utilised within a wide range of psychological difficulties (Yovel et al., 2014). Its relative efficacy against therapeutic techniques of different therapy models, such as CBT, has been explored (Masuda et al., 2010; Deacon et al., 2011; Larsson et al., 2016). The aim of this systematic review is to explore the evidence on whether cognitive defusion is an effective cognitive approach in improving outcomes, as defined by each study, when compared to alternative therapy model components.

2. Method

2.1 Literature Search

The literature search was carried out in October 2018. Table 1 presents the terms used in searching the databases for relevant papers.

Table 1: Search terms and strategy

Search terms
1. Defusion
2. Defus*
3. Cognitive defusion
4. Cognitive defus*
Search strategy
1 or 2 or 3 or 4

2.2 Inclusion and Exclusion Criteria

The following inclusion and exclusion criteria (Table 2) were applied to the initial search results.

Table 2: Inclusion and exclusion criteria

Inclusion/exclusion criteria
Inclusion criteria:
<ul style="list-style-type: none">• Papers comparing the effectiveness of cognitive defusion to another treatment component• Adults• English language• Published in a peer reviewed journal
Exclusion criteria:
<ul style="list-style-type: none">• Lack of comparison to another condition

2.2. Database Search and PRISMA

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) has been developed with the aim of facilitating high quality of reporting in review articles (Moher et al., 2009). The PRISMA guidelines have been used in the current review to demonstrate the flow of information through the different stages (Figures 2 and 3).

The search strategy adopted in this review resulted in 18 studies being identified for final inclusion. Two separate searches were run in October 2018. The first search included the databases of PsychInfo, Medline and Pubmed and initially yielded 1,154 titles. 129 items were removed as duplicates. 1,025 titles were screened for eligibility; 860 were found to be not relevant and 70 items were not articles. The abstracts of the remaining 95 articles were closely screened and the inclusion and exclusion criteria were applied. When not possible to ascertain eligibility based on the abstract, the article was read to its entirety. 31 items had not been published in a peer reviewed journal, 9 were not in English and 5 did not have an adult sample. Finally, 34 studies did not compare cognitive defusion to another condition and were excluded. This resulted in 16 identified papers.

A separate search was run on the Association for Contextual Behavioural Science (ACBS) database to ensure that no relevant studies had been missed. The search yielded 75 results. 52 of these were not relevant (i.e. not cognitive defusion). The abstracts of 23 items were screened and the inclusion and exclusion criteria were applied. 2 items had not been published, 1 was not in English, and 5 did not have an adult sample. 11 studies did not compare cognitive defusion to another condition. 2 of the remaining articles had already been identified in the parallel search. Finally, 2 articles in this search were identified for inclusion. This brought the total to 18 articles.

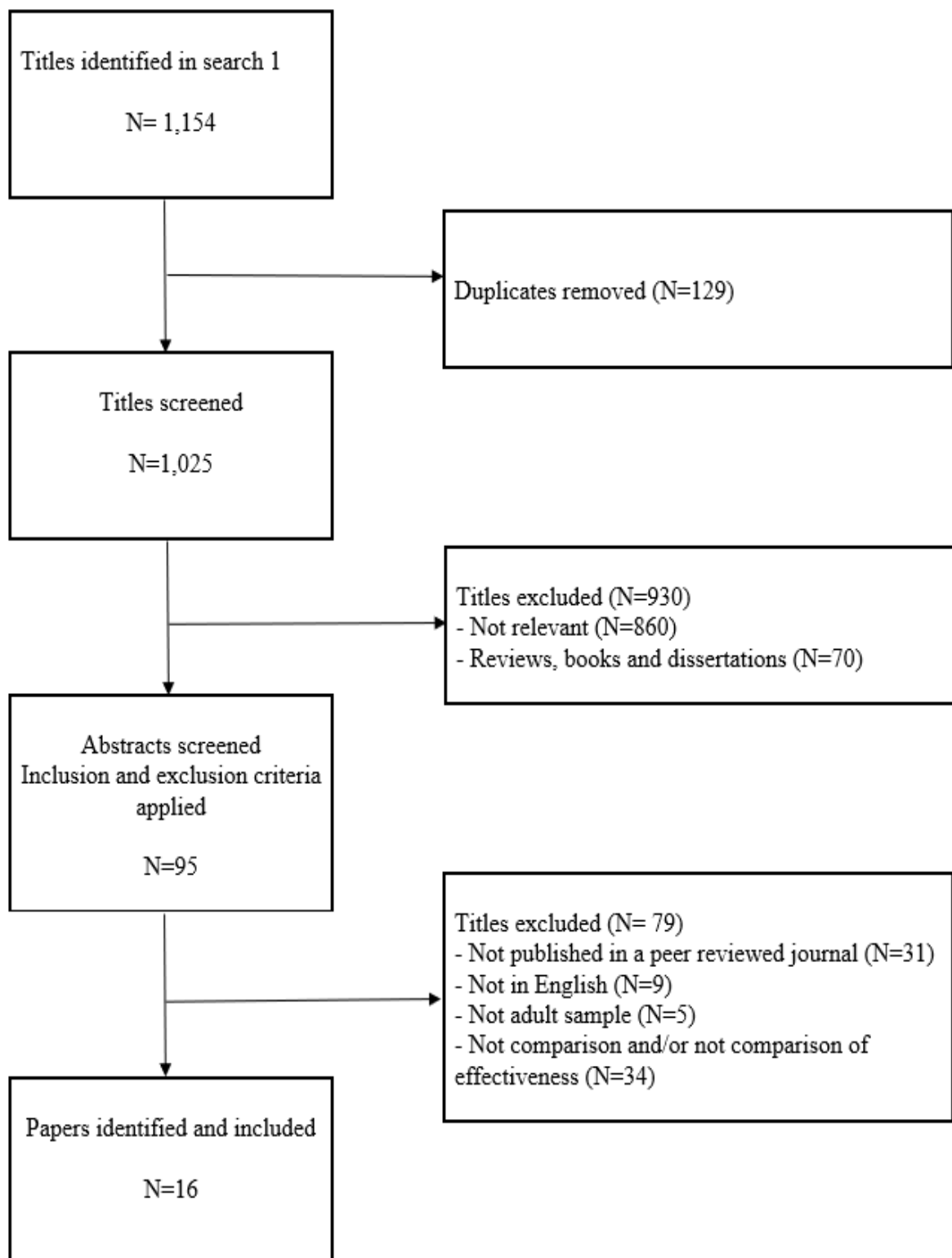


Figure 2. PRISMA flowchart of search in databases PsychInfo, PubMed and Medline

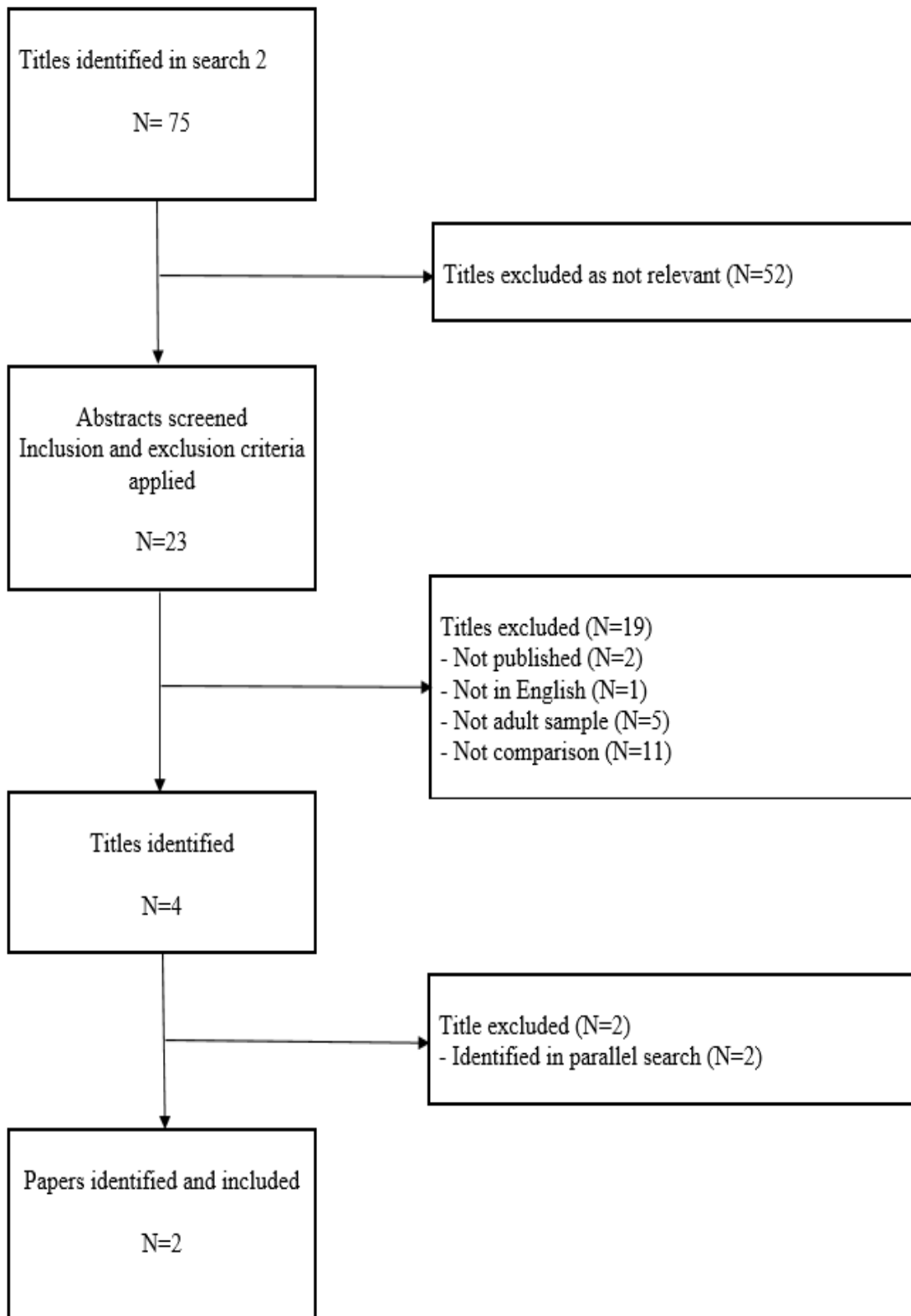


Figure 3. PRISMA flowchart of search in ACBS database

3. Overview of papers

3.1 Summary of papers

Table 3 presents a summary of the identified papers. The aims, samples, conditions, outcome and other measures, and main findings for each paper are reported.

Table 3: Summary of papers.

Study	Aims	Sample	Conditions	Outcome measures	Country of origin	Main findings
Cognitive defusion and self-relevant negative thoughts: examining the impact of a ninety-year-old technique. (Masuda et al., 2004)	To acquire preliminary evidence that cognitive defusion has an effect on the believability of and experienced distress associated with difficult thoughts.	8 undergraduate students	Defusion; Distraction; Thought control	Thought discomfort (Likert-type scale) Thought believability (Likert-type scale)	USA	Discomfort and believability ratings following the defusion condition were reported to be lower than ratings following the distraction and thought control conditions for all participants.
Cognitive defusion versus thought distraction: A clinical rationale, training, and experiential exercise in altering psychological impacts of negative self-referential thoughts. (Masuda et al., 2010)	To explore the effect of an experiential exercise within cognitive defusion and thought distraction on the emotional discomfort and believability of negative self-referential thoughts.	147 undergraduate students Sub-sample (n=71) with elevated depressive symptoms	Partial defusion; Partial distraction; Full defusion; Full distraction; Control	Thought discomfort (Likert-type scale) Thought believability (Likert-type scale)	USA	Emotional discomfort and believability significantly decreased for all conditions. The full defusion group showed significantly greater reductions in discomfort and believability than all other groups. Sub-sample: Emotional discomfort and believability significantly decreased in the four active conditions. The full defusion group showed significantly greater reductions in discomfort than all other groups, and in believability than the partial distraction and control groups.

Study	Aims	Sample	Conditions	Outcome measures	Country of origin	Main findings
Verbal repetition in the reappraisal of contamination-related thoughts. (Watson et al., 2010)	Study 1. To compare the effectiveness of verbal repetition and imaginal exposure in reducing the believability, distress and meaningfulness of contamination-related thoughts.	93 undergraduate students with elevated scores on the contamination subscale of PI-WSUR	Verbal repetition; Imaginal exposure; Control	Thought distress (Likert-type scale); Thought believability (Likert-type scale); Thought meaningfulness (Likert-type scale)	Canada	The Verbal repetition group showed greater improvement in thought ratings pre- to post-intervention, compared to the imaginal exposure group but changes in baseline to follow up were similar. A semantic satiation effect was not found in the verbal repetition condition.
	Study 2. To assess whether verbal repetition would result in semantic satiation compared to imaginal exposure. To compare the effects of verbal repetition and imaginal exposure on negative appraisal, distress, experiential and behavioural avoidance.	134 'non-clinical individuals'	Verbal repetition; Imaginal exposure; Control	The Interpretation of Intrusions Inventory (III); The Acceptance and Action Questionnaire (AAQ); The Vigilance and Avoidance Questionnaire (VAQ); Thought distress (Likert-type scale); Thought believability (Likert-type scale); Thought meaningfulness (Likert-type scale)	Canada	Verbal repetition was more effective than imaginal exposure and control in reducing negative appraisals. Both verbal repetition and imaginal exposure led to improvements in thought ratings and metacognitive appraisals. Only the imaginal exposure group led to a decrease in experiential avoidance.

Study	Aims	Sample	Conditions	Outcome measures	Country of origin	Main findings
The effects of cognitive defusion and thought distraction in emotional discomfort and believability of negative self-referential thoughts. (Masuda, Twohig, et al., 2010)	To compare the impact of a cognitive defusion technique and thought distraction on a negative, self-referential thought.	132 undergraduate students Sub-sample (n=42) with elevated depressive symptoms	Cognitive defusion Thought distraction Control	Emotional discomfort (Likert-type scale) Thought believability (Likert-type scale)	USA	Cognitive defusion was associated with significantly lower emotional discomfort and thought believability than the thought distraction and control groups. Thought distraction was associated with significantly lower emotional discomfort than the control group. Sub-sample: Cognitive defusion was associated with significantly lower emotional discomfort than the control group. Thought believability was significantly reduced for all conditions.

Study	Aims	Sample	Conditions	Outcome measures	Country of origin	Main findings
Cognitive defusion versus cognitive restructuring in the treatment of negative self-referential thoughts: an investigation of process and outcome. (Deacon et al., 2011)	To explore the differential impact of cognitive defusion and cognitive restructuring on negative self-referential thoughts immediately after rationale and training and after one week's homework.	26 undergraduate students scoring highly on the BSQ (similar norms to eating disorder patients)	Cognitive defusion; Cognitive restructuring	The Body Shape Questionnaire (BSQ); The Mirror Task (ratings of distress and body satisfaction); Ratings of the Thought of Being Fat (Likert-type scale of Distress) Ratings of Thoughts Synonymous with Fat (Likert-type scale of Distress; Accuracy; and Importance)	USA	Cognitive defusion and restructuring led to comparable improvements on body image measures from pre-treatment to post-homework. Cognitive defusion led to greater reductions in body image measures immediately after the rationale and training, whereas cognitive restructuring led to greater reductions post-homework. The perceived accuracy of body image-related thoughts was decreased in both conditions with larger reductions being observed in the restructuring group. Thought importance decreased in the defusion group; this was a significant predictor of reduced associated distress.

Study	Aims	Sample	Conditions	Outcome measures	Country of origin	Main findings
A comparison of cognitive restructuring and cognitive defusion as strategies for resisting a craved food. (Moffitt et al., 2012)	To compare the effectiveness of cognitive defusion versus cognitive restructuring in resisting a craved food.	110 members of the general public	Cognitive defusion Cognitive restructuring Control (Waiting list)	<u>Behavioural outcomes</u> : Number of chocolates consumed; Changes in eating behaviours (Likert-type scale); Abstinence from other foods. <u>Cravings</u> : The Chocolate Cravings (state) Questionnaire; The Food Cravings Questionnaire (trait) (FCQ-T). <u>Cognitive</u> : The Automatic Thoughts Questionnaire (ATQ); The Dysfunctional Attitudes Scale (DAS); The Acceptance and Action Questionnaire (AAQ); Self-Efficacy.	Australia	Participants with high levels of cognitive distress in the cognitive defusion group consumed less chocolate than those in the cognitive restructuring and control groups. Cognitive defusion participants were more likely to be abstinent from chocolate, reported greater reduction in external eating and increased personal responsibility for eating behaviours than those in the cognitive restructuring and control groups. Cognitive defusion was rated significantly easier to use than cognitive restructuring.

Study	Aims	Sample	Conditions	Outcome measures	Country of origin	Main findings
An experimental investigation of cognitive defusion. (Pilecki & McKay, 2012)	To provide evidence for the effectiveness of cognitive defusion in coping with evoked emotional states.	67 undergraduate students	Cognitive defusion; Thought suppression; Control	Intensity of induced emotion (Likert-type scale); The Stroop task	USA	No significant differences in the intensity of each induced emotion were found amongst the three groups. A significant difference was found in emotional dysregulation, as measured by the Stroop task, between the cognitive defusion and control groups; however, this is not specified.
Cognitive defusion versus thought distraction in the mitigation of learned helplessness. (Hooper & McHugh, 2013)	To demonstrate the impact of defusion on unwanted psychological content through the use of a behavioural measure. To compare defusion and thought distraction in coping with learned helplessness.	75 undergraduate students	Cognitive defusion; Thought distraction; Control	The Maze task	UK	The cognitive defusion group performed significantly better on the maze task following a learned helplessness preparation, when compared to the thought distraction groups.

Study	Aims	Sample	Conditions	Outcome measures	Country of origin	Main findings
Examination of the core cognitive components of Cognitive Behavioural Therapy and Acceptance and Commitment Therapy: An analogue investigation. (Yovel et al., 2014)	To examine the efficacy of analogue versions of cognitive defusion and cognitive restructuring in targeting negative thinking.	142 college students	Cognitive defusion; Cognitive reappraisal; Control	The PANAS (eight items assessing negative mood); The State Measure of Cognitive Beliefs	Israël	Cognitive defusion and cognitive reappraisal were found to be equally efficacious in reducing negative mood. Mood improvement post-intervention in the cognitive defusion group was associated with the metacognitive belief of acceptance. Mood improvement post-intervention in the cognitive reappraisal group was associated with the metacognitive belief of reappraisal.
Resisting chocolate temptation using a brief mindfulness strategy. (Jenkins & Tapper, 2014)	To examine the effects of cognitive defusion and acceptance on one's ability to resist chocolate consumption. To examine the effects of cognitive defusion and acceptance on automaticity and self-regulation.	137 university students	Defusion Acceptance Relaxation	Number of chocolates consumed; Assessment of Behavioural rebound	UK	Cognitive defusion and acceptance significantly reduced the amount of chocolate consumed. The defusion group showed significant reduction in automaticity post-intervention. Reduced chocolate consumption during the 5-day period was not associated with increased consumption post-intervention (behavioural rebound effect)

Study	Aims	Sample	Conditions	Outcome measures	Country of origin	Main findings
The application of a cognitive defusion technique to negative body image thoughts: a preliminary analogue investigation. (Mandavia et al., 2015)	To examine the differential impact of defusion and thought distraction on a negative body image thought. To evaluate the added effect of an experiential exercise to clinical rationale and training.	254 university students Sub-sample (n=80) with elevated self-referential negative body image thoughts.	Partial defusion Full defusion Partial distraction Full distraction Control	Thought believability (Likert-type scale); Thought discomfort (Likert-type scale); Decentering (Likert-type scale)	USA	Full defusion group showed significant reductions in emotional discomfort and believability compared to all other conditions. Full defusion group showed improved decentering compared to the partial distraction and control groups. Sub-sample findings: Emotional discomfort, believability and decentering improved in all groups post-intervention.
The impact of a cognitive defusion intervention on behavioural and psychological flexibility: an experimental evaluation in a spider fearful non-clinical sample. (Ritzert et al., 2015)	To assess the impact of defusion on spider-specific thought believability. To assess the behavioural process of defusion through the use of the IRAP. To explore whether changes in the IRAP effects were linked to changes in thought believability.	65 university students	Defusion Thought distraction Control	Thought believability (Likert-type scale), Thought distress (Likert-type scale); The Implicit Relational Assessment Procedure (IRAP)	USA	Defusion was linked to reduction in spider-specific thought believability and IRAP effects. It is unclear whether this differed significantly to thought distraction and control conditions respectively.

Study	Aims	Sample	Conditions	Outcome measures	Country of origin	Main findings
A comparison of emotion regulation strategies in response to craving cognitions: Effects on smoking behaviour, craving and affect in dependent smokers. (Beadman et al., 2015)	To compare the effect of the brief interventions of defusion and reappraisal on smoking behaviours and smoking-related outcomes.	73 adult daily smokers	Defusion Reappraisal Thought suppression	Smoking-related: The Fagerstrom Test of Nicotine Dependence (FTND); The Timeline Follow-back (TLFB); Latency to smoke (measured in minutes); The Questionnaire of Smoking Urges- Brief (QSU-Brief); State: The Avoidance and Inflexibility Scale (AIS); The International Positive and Negative Affect Schedule-Short Form (IPANAS-SF)	UK	Defusion and reappraisal groups showed improvements in latency to smoke. The defusion group only showed reductions in smoking-related experiential avoidance. The reappraisal group only showed reductions in craving. Defusion and reappraisal were rated as more credible strategies than suppression; however, this was not found to mediate intervention effects.

Study	Aims	Sample	Conditions	Outcome measures	Country of origin	Main findings
Using brief cognitive restructuring and cognitive defusion techniques to cope with negative thoughts (Larsson et al., 2016)	To compare the effectiveness of cognitive defusion versus cognitive restructuring in coping with negative and unwanted thoughts.	83 students and members of the public	Cognitive restructuring Cognitive Defusion Control	Target thought ratings: Believability (Likert-type scale); Discomfort (Likert-type scale); Negativity (Likert-type scale); Willingness (Likert-type scale); Thought Log of target thought Positive and Negative self-statements ratings (as above) The BDI-II; The State Trait Anxiety Inventory (STAI); The PANAS	UK	The defusion group showed a significantly greater decrease in thought believability, discomfort and an increase in willingness. It also showed a decrease in the frequency of the target thought and BDI-II scores. Both the defusion and restructuring groups showed a significant decrease in thought negativity. Both groups showed an increase in the PA scale of the PANAS.

Study	Aims	Sample	Conditions	Outcome measures	Country of origin	Main findings
An experimental comparison of techniques: Cognitive defusion, cognitive restructuring and in-vivo exposure for social anxiety. (Barrera et al., 2016)	To compare the effect of cognitive defusion, cognitive restructuring and in-vivo exposure on negative thoughts in a sample of social anxiety patients. To explore the mechanisms of change in cognitive defusion and cognitive restructuring.	41 adults with diagnosis of SAD and fear of public speaking	Defusion & Exposure (DC+Exp) Restructuring & Exposure (CR+Exp) Exposure (Exp)	The Self-Relevant Negative Thought Assessment (SRNTA); The Subjective Units of Distress Scale (SUDS)	USA	Similar decreases in distress were observed amongst all three groups. Moderate improvements in perceived thought accuracy post-homework were found in the CR+Exp group. Large improvements in thought importance post-homework were found in the CD+Exp group. Changes in thought accuracy or importance did not predict decrease in distress.

Study	Aims	Sample	Conditions	Outcome measures	Country of origin	Main findings
Comparing cognitive defusion and cognitive restructuring delivered through a mobile app for individuals high in Self-Criticism (Levin et al., 2018)	To assess the relative impact of cognitive defusion and cognitive restructuring on self-criticism and psychological functioning. To assess the differential outcome improvements for each condition. To explore the mediating variables leading to change for each condition.	87 adults high in self-criticism (68.9% female)	Cognitive defusion Cognitive restructuring Waiting list	Forms of Self-Criticism and Self-Reassurance Scale (FSCRS); The Depression, Anxiety and Stress Scale-21 (DASS-21); The Work and Social Adjustment Scale (WSAS)	USA	Cognitive defusion and cognitive restructuring led to similar improvements in self-criticism and psychological functioning. Improvements in outcomes in the defusion condition were correlated with improvements in self-compassion and cognitive decentering. Cognitive defusion was not found to have an impact on cognitive fusion. Cognitive restructuring was not found to have an impact on reappraisal. CBT strategies can be effectively delivered through a mobile app.

Study	Aims	Sample	Conditions	Outcome measures	Country of origin	Main findings
Cognitive defusion versus experiential avoidance in the reduction of smoking behaviour: an experimental and preliminary investigation (Hooper et al., 2018)	To explore whether cognitive defusion and experiential avoidance are effective in reducing short-term smoking behaviour. To explore whether reductions in smoking behaviour will not be followed by an inflation in smoking in the cognitive defusion condition.	54 undergraduate students (16 female)	Cognitive defusion Experiential avoidance Control	Smoking diary	UK	Participants in the defusion condition smoked significantly less than those in the control condition during the intervention week. Smoking reductions in the experiential avoidance and control conditions were similar during the intervention week. Participants in the defusion condition only smoked significantly less in the week following the intervention.
Cognitive defusion and guided imagery tasks reduce naturalistic food cravings and consumption: a field study (Schumacher et al., 2018)	To examine the differential effects of cognitive defusion and guided imagery on naturalistic food cravings and cravings-related consumption.	118 female participants	Cognitive defusion; Guided imagery; Control	Craving frequency; Craving intensity (Likert-type scale); Craving percentage followed by consumption; Craving-related calories consumed	Australia	There were no significant differences found between the two experimental conditions. Both cognitive defusion and guided imagery groups reported a significant reduction in craving frequency and intensity, percentage of cravings followed by consumption, and calorie intake per craving occasion and total craving-related calorie intake for the week.

4. Quality review

4.1 Quality Framework

A checklist developed by Downs and Black (1998) (Appendix 1) was utilised in order to assess the methodological quality of the studies identified in the literature search. The checklist allows the methodological evaluation of both randomised and non-randomised trials, provides an overall Quality Index and attempts to assess the external validity of the studies. The checklist consists of 27 items, organised in five subscales; Reporting, External validity, Internal validity- bias, Internal validity- confounding and, Power. Each item is scored 0 or 1 with the exception of one item scored 0, 1 or 2, and another item scored 0-5. The possible scores of the acquired Quality Index range from 0 to 32. The higher the score of the Index, the higher the methodological quality of the study (Downs &Black, 1998).

The checklist was chosen as it provides the opportunity to create a comparative profile of the studies' strengths and weaknesses, and allows the tempered interpretation of said studies' findings. It also facilitates the evaluation of randomised and non-randomised trials with one scale. Furthermore, the present checklist makes an attempt at looking at external validity, which is highly relevant when evaluating healthcare studies, due to the ramifications on clinical practices (Downs & Black, 1998). Despite this last point, the developers of the checklist acknowledge that the reliability of the external validity subscale is poor and provide possible explanations for this (Downs & Black, 1998).

4.2 Quality scores

Table 4 presents the Quality scores for each paper. A total score for each paper is reported, taking into account any non-applicable items.

Table 4: Quality checklist and scores.

	Masuda et al. (2004)	Masuda et al. (2010)	Watson et al. (2010)-1	Watson et al. (2010)-2	Masuda et al. (2010)	Deacon et al. (2011)	Moffit et al. (2012)	Pilecki & McKay (2012)	Hooper & McHugh (2013)
1. Aims Described	1	1	1	1	1	1	1	0	1
2. Outcomes Described	1	1	1	1	1	1	1	0	1
3. Patient Characteristics	0	1	1	1	1	1	1	1	1
4. Interventions described	1	1	1	1	1	1	1	1	1
5. Confounders described	0	2	2	2	1	1	2	2	2
6. Main findings described	0	1	1	1	1	1	1	0	1
7. Estimates of random variability in data provided	1	1	1	1	1	1	1	1	1
8. Adverse events reported	0	0	0	0	0	0	0	1	0
9. Patient characteristics lost to follow-up described	NA	NA	1	1	NA	NA	NA	NA	NA
10. Actual probability values reported	0	0	1	1	0	0	1	1	1
11. Potential participants representative of population	0	0	0	0	0	0	0	0	0
12. Actual participants representative of population	0	0	0	0	0	0	0	0	0
13. Facilities representative	0	0	0	0	0	0	0	0	0
14. Blind subjects	0	0	0	0	0	0	0	0	0
15. Blind researchers measuring outcomes	0	0	0	0	0	0	0	0	1
16. Data dredging clear	1	1	1	1	1	1	1	1	1
17. Analyses adjust for different lengths of follow-up	NA	NA	NA	NA	NA	NA	NA	NA	NA

18. Statistical tests appropriate	0	1	1	1	1	1	1	1	1
19. Compliance with interventions reliable	0	0	0	0	0	0	0	1	0
20. Outcome measures accurate (valid & reliable)	0	0	0	1	0	0	1	1	1
21. Group participants recruited from same population	1	1	1	1	1	1	1	1	1
22. Group participants recruited over same period time	1	1	1	1	1	1	1	1	1
23. Randomization to groups	NA	1	1	1	1	1	1	1	1
24. Randomization concealed	NA	0	0	0	0	0	0	0	1
25. Adequate adjustment for confounding in analyses	0	1	0	0	1	1	1	1	1
26. Losses to follow-up taken into account	NA	NA	1	1	NA	NA	NA	NA	NA
27. Sufficient power	0	0	0	0	0	0	0	0	0
Total	8/22	14/24	16/26	17/26	13/24	13/24	16/24	15/24	18/24

	Jenkins & Tapper (2014)	Yovel et al. (2014)	Mandavia et al. (2015)	Ritzert et al. (2015)	Beadman et al. (2015)	Larsson et al. (2016)	Barrera et al. (2016)	Levin et al. (2018)	Hooper et al. (2018)	Schumacher et al. (2018)
1. Aims Described	1	1	1	1	1	1	1	1	1	1
2. Outcomes Described	1	1	1	1	1	1	1	1	1	1
3. Patient Characteristics	1	1	1	1	1	1	1	1	1	1
4. Interventions described	1	1	1	1	1	1	1	1	1	1
5. Confounders described	2	2	2	2	2	1	0	2	2	2
6. Main findings described	1	1	1	1	1	1	1	1	1	1
7. Estimates of random variability in data provided	1	1	1	1	1	1	1	1	1	1
8. Adverse events reported	0	1	0	0	0	0	0	0	0	0
9. Patient characteristics lost to follow-up described	0	NA	NA	NA	0	0	0	0	0	0
10. Actual probability values reported	1	1	1	1	1	1	1	1	1	1
11. Potential participants representative of population	0	0	0	0	0	0	0	1	0	0
12. Actual participants representative of population	0	0	0	0	0	0	0	0	0	0
13. Facilities representative	0	0	0	0	0	0	0	0	0	0
14. Blind subjects	0	0	0	0	0	0	0	0	0	0
15. Blind researchers measuring outcomes	0	0	0	0	0	0	0	0	0	0
16. Data dredging clear	1	1	1	1	1	1	1	1	1	1
17. Analyses adjust for different lengths of follow-up	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

18. Statistical tests appropriate	1	1	1	1	1	1	1	1	1	1
19. Compliance with interventions reliable	1	1	0	0	1	0	0	1	0	1
20. Outcome measures accurate (valid & reliable)	1	0	0	1	1	1	1	1	0	1
21. Group participants recruited from same population	1	1	1	1	1	1	1	1	1	1
22. Group participants recruited over same period time	1	1	1	1	1	1	1	1	1	1
23. Randomization to groups	0	1	1	0	1	1	1	1	1	0
24. Randomization concealed	1	0	0	0	0	0	0	0	0	0
25. Adequate adjustment for confounding in analyses	1	1	1	1	1	1	0	1	1	1
26. Losses to follow-up taken into account	1	NA	NA	NA	0	0	0	1	1	0
27. Sufficient power	0	0	0	0	1	0	0	0	0	1
Total	18/26	17/24	15/24	15/24	18/26	15/26	13/26	19/26	16/26	17/26

5. Findings

5.1 Samples

The studies in the current review include a total of 1,846 participants. 13 of the studies utilised student samples (N= 1,283). One study (Watson et al., 2010; study 2) did not specify the origin of the sample, referring to their sample as ‘non-clinical individuals’ (N=134). Moffit et al. (2012) describe their sample (N=110) as members of the public. 73 participants were described as ‘adult daily smokers’ (Beadman et al., 2016); 41 were adults with a Social Anxiety Disorder diagnosis (SAD; Barrera et al., 2016), and 87 were adults with high self-criticism (Levin et al., 2018). 1,354 of the participants were females, with one study (Beadman et al., 2016) not specifying the gender proportions within their sample.

Only three studies utilised a clinical sample; individuals scoring above the mean for eating disorders (Deacon et al., 2011), individuals with a SAD diagnosis (Barrera et al., 2016), and adults with high self-criticism (Levin et al., 2018). However, two more studies have used clinical screening to separate subsamples with elevated scores on a given scale. Masuda et al. (2010) used the Beck Depression Inventory- II (BDI-II), which resulted in a subsample with elevated BDI-II scores. Mandavia et al. (2015) acquired a subsample of 68 with elevated self-referential negative body image thoughts.

5.2 Comparative strengths and weaknesses

The quality scores (Table 4) allow a consideration of the studies' comparative strengths and weaknesses. This is organised according to the subscales of the Downs and Black (1998) quality framework.

Reporting

This subscale, consisting of 10 items, assesses whether all relevant information has been reported, so that the reader can evaluate the findings of the study without bias (Downs & Black, 1998). Overall, most studies have acquired high scores within this subscale. Almost all studies have described their aims, outcomes, patient characteristics, and interventions adequately. Many of the studies have described potential confounders and have utilised screening tools to ascertain that the groups within their study did not differ significantly in the identified areas. Almost all studies have reported actual probability values. However, only one (Pilecki, & McKay, 2012) has reported adverse events. This suggests that adverse events following participation may have gone unreported. This is particularly important, as the studies included in this review have explored the effectiveness of interventions. Potential adverse events immediately or soon after participation would highly impact on whether a said intervention is effective and appropriate for clinical use.

External validity

This subscale assesses whether the findings of the study can be generalised to the population that the study sample came from, and consists of 3 items (Downs & Black, 1998). All studies scored 0 in all three items of this subscale. Although most studies have reported how the sample had been selected from the population, none has followed sampling methods that would ensure that the chosen participants were representative of the population (i.e. use of the entire source population, an unselected sample of consecutive patient or a random sample).

Furthermore, no study has reported the proportion of those asked who finally agreed to participate, nor has any study demonstrated that the distribution of potential confounding factors is the same for the sample and the population it was derived from. This item has been rated as '*Unable to determine*' for all studies. Finally, when the facilities where assessment and intervention took place was reported, this tended to be university based. As such, the facilities were not representative of where similar interventions would be delivered to patients. This item has been rated as '*No*' for all studies.

Internal validity- bias

This subscale assesses whether any biases in the measurement of the intervention and outcomes were present (Downs & Black, 1998), and consists of 7 items. There is variability in the scores the studies acquired on the different items of this subscale. All but one study received a score of 0 in the two questions regarding blinding. Hooper and McHugh (2013) were the only study which reported blinding the researchers measuring outcomes. Similarly, reliable compliance with interventions was mostly rated as '*Unable to determine*' due to the studies not having assessed and/or reported whether participants utilised their allocated intervention. Exceptions to this were Pilecki & McKay (2012), who asked participants whether they had used their allocated strategy, and Beadman et al. (2015), who asked participants to describe the strategy they used to ascertain the assigned intervention was used reliably. Similarly, Schumacher et al. (2018) asked participants to confirm whether their allocated strategy had been followed as instructed and Hooper et al. (2018) asked how much the allocated procedure had been used. Pilecki & Mc Kay (2012) were the only ones to explore what strategies the control condition participants spontaneously used.

Use of valid and reliable outcome measures has been a shortcoming of many of the studies. Although standardised measures have been used by many of the studies for screening

purposes (i.e. entry requirements or identification of potential confounders), outcomes have often been measured by the use of two or three questions, scored on a Likert-type scale. Questions on Thought Discomfort or Distress, Thought Believability, Thought Accuracy, and Thought Importance have been used and participants have been asked to rate these on a 0-100 scale (Barrera et al., 2016; Mandavia et al., 2015; Masuda & Hayes, 2004; Pilecki et al., 2012; Watson et al., 2010). On the contrary, some of the studies have used standardised measures (Beadman et al., 2015; Levin et al., 2018; Yovel et al., 2014). Some have used objective behavioural outcome measures, such as number of chocolates consumed (Hooper et al., 2018; Jenkins & Tapper, 2014; Moffit et al., 2012; Schumacher et al., 2018).

Data dredging did not appear to be an issue in any of the studies. As per the checklist specifications, none of the studies reported “retrospective unplanned subgroup analyses” (Downs & Black, 1998).

Internal validity- confounding

This subscale, consisting of 7 items, deals with the presence of bias in the selection of study participants (Downs & Black, 1998). The participants in all studies had been recruited from the same population and over the same time period. Hence, all studies scored highly in these questions. Only three studies did not clearly report randomisation of participants into groups, Jenkins & Tapper (2014), Ritzert et al. (2015) and, Beadman et al. (2015). Therefore, this item was scored as ‘Unable to determine’ for these studies. Most of the studies have not reported whether they concealed assignment to the groups from participants and staff, and so this question has mostly been rated as ‘Unable to determine’. The exceptions to this are Hooper & McHugh (2013), and Jenkins & Tapper (2014).

Power

This subscale tries to assess whether negative findings may be attributable to chance (Downs

& Black, 1998). All but two studies have not reported whether their sample size had been calculated so that the study would have sufficient power to detect a difference between the interventions. Beadman et al. (2015) and Schumacher et al. (2018) have made power calculations and, hence, been given a score of 1 for this item.

5.3 Specific methodological considerations

5.3.1 Cognitive defusion techniques

Within this review, the effectiveness of cognitive defusion is compared against other interventions. These are: cognitive restructuring, distraction, thought suppression, acceptance, and guided imagery. There is little variation in the implementation of these interventions. Cognitive defusion, however, is a process, which can be clinically applied using a variety of different techniques. This is reflected in the studies included in the review, which have utilised more than one defusion techniques. ‘Word repetition’ (i.e. the ‘milk’ exercise) is the most used defusion technique (Barrera et al., 2016; Deacon et al., 2011; Mandavia et al., 2015; Masuda et al., 2004; Masuda et al., 2010; Ritzert et al., 2015; Watson et al., 2010), followed by ‘Viewing thoughts merely as thoughts’ (Hooper & McHugh, 2013; Jenkins & Tapper, 2014; Moffit et al., 2012; Pilecki & McKay, 2012, Schumacher et al., 2018). Beadman et al. (2015) utilised the technique of ‘I’m having the thought. Larsson et al. (2016) utilised the same technique in addition to ‘Musical thoughts’ and ‘Funny voices in your head’. Finally, Yovel et al. (2014) also utilised a combination of techniques, ‘Writing thoughts with left hand’, ‘Visualising thoughts from different vantage points’ and, ‘Cartoon characters thinking the thought’.

5.3.2 Measure of cognitive defusion

An additional consideration is the lack of a cognitive defusion measure in most of the studies. Despite all the studies seeking to explore the impact of cognitive defusion on identified areas, all but one (Levin et al., 2018) do not measure whether participants have experienced a change in defusion. One would expect that an intervention facilitating defusion would only lead to improved outcomes if the person actually experiences a change in defusion, or, rather, if the person becomes less 'fused'.

Levin et al. (2018) are the only researchers, who utilised the Cognitive Fusion Questionnaire (CFQ; Gillanders et al., 2014) as a process measure for cognitive defusion. The CFQ measures fusion, the reverse process of defusion within the ACT model, which refers to the tendency of viewing thoughts as true. Cognitive decentering is also measured for the same purpose within this study. Decentering is defined as one's ability to separate oneself from one's thoughts and emotions (Gillanders et al., 2014). This definition highlights a noticeable overlap between decentering and defusion. However, Gillanders et al. (2014) consider decentering to be broader than defusion, as it also encompasses the concepts of acceptance and self-compassion. Interestingly, Levin et al. (2018) solely reported results on cognitive decentering and not fusion.

5.3.3 Delivery of interventions and follow up

Further considerations within this review are the delivery of interventions, the length of intervention training and the presence of a follow up.

The interventions are delivered in a variety of ways across the studies, most often in the form of a written script (Hooper & McHugh, 2013; Mandavia et al., 2015; Larsson et al., 2016).

Some studies have delivered the intervention training through video (Watson et al., 2010), audio (Schumacher et al., 2018) or online (Levin et al., 2018). The duration of the intervention training varies greatly, from 3 (Schumacher et al., 2018) to 60 minutes (Moffit et al., 2012). Most studies have structured the delivery of the intervention in a similar manner: rationale for the allocated strategy and training in this (Jenkins & Tapper, 2014), with most studies adding an experiential exercise, where participants practice applying their allocated strategy to a relevant target thought (Barrera et al., 2016; Deacon et al. 2011; Yovel et al., 2014).

The earlier studies in this review mostly followed the procedure of pre-assessment, intervention training and post-assessment within the same session (Masuda et al., 2010; Pilecki & McKay, 2012). However, homework was added to later studies with participants instructed to practice their allocated intervention daily, usually for a week (Deacon et al., 2011; Jenkins & Tapper, 2014; Schumacher et al., 2018). This appears to better approximate clinical practice, as clients would usually learn and practice a new technique within a session and then be instructed to practice this further within sessions (Luoma et al., 2007).

Finally, no study has included a follow up at a later time to examine whether participants continued to use their allocated strategy and if any treatment benefits have been maintained.

5.4 Cognitive defusion vs cognitive restructuring

Both CBT and ACT are concerned with identifying cognitions, especially negative thoughts (Barrera et al., 2016). Whereas CBT engages with this at the level of thought content, ACT is mostly concerned with the context and function of such thoughts. Cognitive restructuring (or

reappraisal) and cognitive defusion are the main cognitive approaches used by the respective models to target negative or unwanted thoughts at these two different levels.

Within the present review, seven studies look at the comparative effect of cognitive defusion and cognitive restructuring on chosen outcomes. Four of these examine the impact of the two approaches on negative thinking in adults with SAD (Barrera et al., 2016), students (Larsson et al., 2016; Yovel et al., 2014), and students with body-image related issues (Deacon et al., 2011). One study assesses the impact on resisting a craved food in members of the public (Moffitt et al., 2012), one on smoking behaviours in adult smokers (Beadman et al., 2015), and one study on self-criticism and psychological functioning in adults with high self-criticism (Levin et al., 2018). Deacon et al. (2011), who measured body-related negative thoughts and associated distress, found cognitive restructuring and defusion to have comparable outcomes. Both interventions led to improvements on body image measures. The authors found thought importance, which was better targeted by defusion, to be a significant predictor of reduced associated distress. Yovel et al. (2014) examined the impact of the interventions on mood and found that both were equally efficient in reducing negative mood. Larsson et al. (2016) looked at the impact on thought related measures (i.e. thought believability, discomfort and willingness to have the thought) and mood. Both interventions were found to lead to mood improvements, with defusion leading to greater decrease in thought associated discomfort. Similarly, Barrera et al. (2016) found that defusion and restructuring had a comparable impact on thought associated distress. Levin et al. (2018) found that both defusion and restructuring led to similar improvements in self-criticism and psychological functioning.

Moffit et al. (2012) looked at the impact of the two interventions on the ability to resist a craved food, and cognitive and attitude outcomes. They found that cognitive defusion was more likely to be linked to abstinence from chocolate, reduced external eating and increased personal responsibility for eating behaviours. However, both interventions led to similar improvements in the frequency and believability of negative thoughts, dysfunctional attitudes, psychological flexibility and self- efficacy. Beadman et al. (2015), who examined the effect of defusion and restructuring on smoking behaviours, found that both interventions led to improvements in latency to smoke. Only the defusion group showed reductions in smoking-related experiential avoidance, whereas only the restructuring group showed reductions in craving.

Overall, both interventions were found to be equally efficacious.

5.5 Cognitive defusion vs other interventions

Within this review, cognitive defusion has also been compared to a variety of other interventions. Six studies have examined the comparative impact of defusion and thought distraction. All six studies utilised a student sample. Within this context, the authors define thought distraction as “an effort to selectively attend to an emotionally less distressing event or situation” (Masuda et al., 2010, p. 525). Masuda et al. (2004) were the first to compare cognitive defusion to thought distraction, a technique used with some effectiveness to deal with unwanted thought content (Masuda, Twohig et al., 2010). Although methodologically weak, this study indicated a positive impact of cognitive defusion on thought believability and discomfort, which warranted more research in this area. Masuda et al. (2010) followed this up with another study, which found that cognitive defusion led to better outcomes than

distraction when an experiential exercise was added. Similar findings were found in a subsequent study (Masuda, Twohig et al., 2010). Hooper and Mc Hugh (2013) compared defusion and thought distraction in coping with learned helplessness. In this study, participants in the defusion group performed significantly better on a behavioural measure following a learned helplessness task than those in the distraction group. Mandavia et al. (2015) explored the impact of the two approaches on a negative body image thought. The defusion technique, which included an experiential exercise, showed greater reductions in emotional discomfort and thought believability than thought distraction. Ritzert et al. (2015) looked at the impact of these approaches on spider-specific thoughts. They found defusion to be linked to a reduction in spider-specific thought believability; however, they do not report clearly whether this was significantly different to thought distraction. Cognitive defusion was also compared to thought suppression (Pilecki & McKay, 2012). The authors found defusion and suppression to have similar impact on the intensity of induced emotions. They do not report clearly on the differential impact of the interventions on emotional dysregulation. Hooper et al. (2018) compared the effectiveness of defusion and experiential avoidance in reducing smoking behaviour. The experiential avoidance intervention was described as a combination of thought suppression and distraction, similar to the studies above. The authors found defusion to be equally effective to experiential avoidance at reducing smoking post-intervention. However, at one-week follow-up, defusion had led to greater reductions in smoking.

Watson et al. (2010) examined the effectiveness of a cognitive defusion technique and imaginal exposure in the reappraisal of contamination-related thoughts in students. Defusion led to greater improvements immediately post-intervention but similar effects were found at one-week follow-up. In a second study, Watson et al. (2010) found defusion to be more

effective in reducing negative appraisals in a non-clinical sample. Interestingly, imaginal exposure led to a decrease in experiential avoidance whereas defusion did not. Schumacher et al. (2018) also examined defusion and guided imagery and their effect on food cravings and craving-related food consumption in a female sample. Both interventions led to similar benefits in craving frequency and intensity, and craving-related consumption.

Finally, defusion was compared to acceptance by Jenkins and Tapper (2014), who looked at the comparative impact of these approaches on one's ability to resist chocolate consumption, automaticity and self-regulation in students. Both cognitive defusion and acceptance significantly reduced the amount of chocolate consumed. Post-intervention, defusion was found to lead to greater reduction in chocolate-related automaticity.

5.6 Subjective treatment- related measures

Several studies included measures of subjective treatment ratings. That is, participants were asked to rate their allocated intervention on a variety of different processes, such as treatment effectiveness and feasibility (Mandavia et al., 2015; Masuda et al., 2010), expectancy (Deacon et al., 2011), credibility (Beadman et al., 2015; Deacon et al., 2011), ease of use (Moffitt et al., 2012), and intention to use in the future (Mandavia et al., 2015; Masuda et al., 2010). Defusion was subjectively rated as more effective, feasible and likely to be used in the future than the alternative intervention (Masuda et al., 2010). Defusion and Imaginal Exposure were rated as equally credible with the use of a standardised credibility measure and based on treatment rationale. Defusion and cognitive restructuring were also rated equally on treatment credibility and expectancy (Deacon et al., 2011). Defusion and cognitive restructuring were rated equally effective and efficient, although defusion was rated as easier

to use though (Moffitt et al., 2012). Yovel et al. (2014) looked at the link between post-treatment perceived efficacy of the allocated intervention and mood improvement. The findings of this study suggested that perceiving the intervention as helpful was linked to better outcomes in the Cognitive Restructuring group. This was not found in the Defusion group. Mandavia et al. (2015) found no differences between defusion and distraction in subjective treatment ratings on effectiveness, efficacy and intention to use in the future. Beadman et al. (2015) found expectancy to be linked to greater reductions in smoking behaviours; however, neither expectancy nor credibility mediated intervention-related improvements. Defusion and experiential avoidance were rated similarly for confidence and usefulness (Hooper et al., 2018).

6. Discussion

ACT has a growing evidence base for its effectiveness with a wide range of presentations and across different populations (A-Tjak et al., 2015). Following the model ethos of a bottom-up approach in research (Hayes et al., 2006), the current review sought to explore the available evidence on the relative efficacy of cognitive defusion in improving outcomes against alternative cognitive interventions. A total of 18 studies were included.

6.1 Findings

6.1.1 What is cognitive defusion?

Cognitive defusion, one of the cognitive processes of the ACT Hexaflex, aims to lessen the impact of cognitive fusion; or in other words, the control that dominant thoughts place on

behaviour (Assaz et al., 2018), which, in turn, is likely to lead to a limited behavioural repertoire (Hayes et al., 2006).

Unlike other therapeutic interventions, cognitive defusion can be fostered in a variety of ways and using a range of different techniques. In this review only, eight different techniques have been utilised within the identified studies. To complicate matters further, Assaz et al. (2018) suggest that, in fact, different procedures underlie the particular techniques; for instance, word repetition is thought to fall under the procedure of Playing with Words, and the ‘I’m having the thought that..’ technique falls under the procedure of Identifying Relational Responses. This suggests that cognitive defusion can follow different pathways in achieving the change of context of thoughts and highlights the complexity of the process of defusion. Although the overarching process is thought to be one and the same, the procedures and techniques used in the studies to foster cognitive defusion vary greatly. This variability poses an added complication when attempting to draw conclusions on the effectiveness of cognitive defusion. What is not known, at this point, is whether some defusion techniques and/or underlying procedures are more effective than others in changing the context of unhelpful thoughts or promoting behavioural change.

6.1.2 Mode of delivery of intervention- does it matter?

The mode of delivery of the interventions seems to vary across three areas: the medium of delivery, the length of the intervention and the components included in the intervention.

In an attempt to control for researcher bias, the interventions have been delivered to participants with the use of different media; most often by means of a written script (Hooper & McHugh, 2013; Mandavia et al., 2015; Larsson et al., 2016), a training video (Watson et

al., 2010), audio (Schumacher et al., 2018) or a mobile application (Levin et al., 2018). The authors have not provided a rationale for their chosen medium. They have also not discussed other potential biases that the chosen medium may be sensitive to. For instance, written scripts may be sensitive to participants' level of education. Any chosen medium may be sensitive to some type of bias; however, these have not been discussed by the authors. Similarly, one may also question whether certain media may be more effective than others. For instance, would a training video be more effective in explaining and demonstrating the technique in question than a written script, which may be more open to interpretation by the participant?

Although there is an obvious advantage to controlling for researcher bias, it is worth considering how these media differ to common clinical practice, where a new intervention would be introduced by a therapist in person. This allows for the rationale to be discussed, questions to be answered, and difficulties in implementing the intervention and possible resistance to the intervention to be addressed. This means that the impact observed in these studies may not necessarily be transferred into clinical practice or, in fact, that the lack of face to face contact during training is a hinderance to participants effectively applying the technique.

Secondly, the duration of the intervention training varies greatly across the studies, and ranges from 3 (Schumacher et al., 2018) to 60 minutes (Moffit et al., 2012). Schumacher et al. (2018) provided a 3-minute training of cognitive defusion and guided imagery to two experimental groups respectively. They found no differential impact of the two techniques on naturalistic food cravings and consumption. In contrast, Moffit et al. (2012) provided the longest training, at 60 minutes, on cognitive defusion and restructuring. They found defusion

to be linked to better behavioural outcomes. Although the length of the intervention alone may not be the most significant factor in influencing the detection of an impact, it is not known how it may affect this.

Thirdly, the delivery of the intervention also varies across the studies. Although the majority provide a rationale for the allocated strategy, then training in this (Jenkins & Tapper, 2014), most studies add an experiential exercise, where participants apply their allocated strategy to a relevant target thought (Barrera et al., 2016; Deacon et al. 2011; Yovel et al., 2014).

Masuda et al. (2010) and Mandavia et al. (2015) looked at the impact of adding an experiential exercise to rationale and training. They both found that the groups that received the experiential exercise showed greater improvements in each study's chosen outcomes than the groups that did not.

In summary, we know very little about the impact of the mode of delivery of defusion techniques on chosen outcomes. The technique of word repetition has been studied to some extent. We know that the repetition of the target word needs to exceed 30 seconds to have the desired effect (Masuda et al., 2009), that the rate of repetition plays an important role (Tyndall et al., 2017), and that the addition of an experiential exercise has a beneficial impact (Mandavia et al., 2015; Masuda et al., 2010). Our understanding, however, of how the delivery of other defusion techniques may impact on their effectiveness is rather limited.

6.1.3 Does cognitive defusion work?

The effectiveness of cognitive defusion has been measured against therapeutic techniques of, mainly, other therapy models such as CBT. Seven studies within this review compared cognitive defusion to cognitive restructuring and eleven studies compared defusion to other

techniques, including thought distraction, thought suppression, experiential avoidance, imaginal exposure, guided imagery, and acceptance.

Despite some differential impact on certain measures, overall, cognitive defusion and restructuring have been equally efficacious in leading to improved outcomes. Both interventions were found to lead to improved body image outcomes (Deacon et al., 2011), decrease in the frequency and believability of negative thoughts (Moffit et al., 2012), decreased negative mood (Larsson et al., 2016; Yovel et al., 2014), increased latency to smoke (Beadman et al., 2015), decreased thought-associated distress (Barrera et al., 2016), decreased self-criticism and improved psychological functioning (Levin et al., 2018).

Defusion was linked to better behavioural outcomes related to the ability to resist a craved food (Moffit et al., 2012), and decreased smoking-related experiential avoidance (Beadman et al., 2015). Cognitive restructuring, on the other hand, was linked to reduced smoking-related craving (Beadman et al., 2015). Defusion was also found to have a similar impact to thought suppression on the intensity of induced emotions (Pilecki & McKay, 2012), to imaginal exposure on the reappraisal of contamination-related thoughts at one-week follow-up (Watson et al., 2010), to guided imagery on craving frequency and intensity, and craving-related consumption (Schumacher et al., 2018), and to acceptance on chocolate consumption (Jenkins & Taper, 2014). Defusion was, however, found to have greater effect than thought distraction in reducing thought believability and discomfort (Masuda et al., 2010), coping with learned helplessness (Hooper & McHugh, 2013), and reducing negative body image-related thought believability and discomfort (Mandavia et al., 2015). Finally, cognitive defusion was subjectively rated as equally credible, effective, efficient and likely to be used in the future as the compared techniques (Deacon et al., 2011; Mandavia et al., 2015; Moffit et al., 2012).

Overall, these results suggest that cognitive defusion is, at least, as effective as the alternative interventions it has been compared to. Nevertheless, an important limitation of these studies is that they have failed to measure cognitive defusion. To attribute any benefits to cognitive defusion, one must be able to demonstrate that participants have become less ‘fused’ and therefore the improvements are likely to be linked to defusion. In this case, although the improvements are observed in the studies, the lack of a cognitive defusion measure renders the link between the two weaker.

6.2 Methodological issues

Through the application of a quality framework, common methodological limitations amongst the studies became obvious. All studies employed sampling methods that do not allow the generalisation of any conclusions made to the population. This is most important in clinical research and, certainly, the application of findings into clinical practice. Therefore, conclusions made by the individual studies refer to the specific samples only. Secondly, only two studies assessed whether participants did indeed utilise their allocated intervention. The lack of this means that other factors, such as a placebo effect (i.e. participants knowing that they are being taught a therapeutic intervention), may have influenced the results. Only one of the studies blinded the researchers measuring outcomes, and so, any results may be sensitive to researcher bias. Only two of the studies power-calculated their sample sizes. So, it is possible that impact of the interventions may have been missed due to insufficient power.

Due to these methodological limitations, conclusions should be made tentative.

6.3 Implications for clinical practice

Taking into consideration the limitations already mentioned, the results of the studies within this review suggest that cognitive defusion may be as effective as alternative (cognitive) therapeutic techniques. This would, in turn, suggest that cognitive defusion can be used in clinical practice with clients.

Why would a therapist choose cognitive defusion instead of another technique if both are equally effective? One possible answer may be that viewing negative thoughts as a normal part of life is a more realistic standpoint than the attempt to rid oneself from said thoughts (Harris, 2006). However, this also poses the question of who is meant to be making this choice. Individual therapists will, naturally, have their own preferences but this seems to be a choice for the client. In acquiring informed consent for therapy, perhaps therapists are to offer the alternative effective techniques and give the choice to the client.

An additional consideration is the context in which defusion is utilised clinically. Does defusion need to be used within a wider ACT intervention or not necessarily? The studies in the present review examined the effectiveness of cognitive defusion alone. What is not known is whether the impact of defusion is different when used within the context of an ACT intervention. The six processes within the ACT hexaflex are interdependent and there is certainly great overlap between specific processes (i.e. defusion and self-as-context) (Foody et al., 2013). An experienced ACT therapist should address different processes fluidly within a session, according to the clinical material presented (Harris, 2009; Luoma et al., 2007). This may suggest that the isolation of one process in clinical practice is artificial and perhaps counterproductive.

As therapists and services use outcome measures to monitor therapy effectiveness, it is recommended that a measure of cognitive defusion is used in conjunction with other measures, when this approach is utilised. This will allow therapists to examine whether any improvements can, indeed, be linked to the intervention.

Finally, none of the studies within this review have reported on adverse events. Therefore, our understanding of this is limited and it would be advisable to monitor for adverse reactions to defusion in clinical practice.

6.4 Suggestions for future research

To improve our knowledge on the effectiveness of cognitive defusion, future research needs to address current limitations, so that more robust conclusions can be drawn.

Firstly, our understanding of the potential differential impact of the various defusion techniques needs to improve, as this would have significant clinical implications. When a sufficient number of relevant papers is available, a meta-analysis on the effectiveness of different defusion techniques would add greatly to the existing knowledge. All future research needs to include the report of adverse effects, as this is imperative for the application to clinical practice.

It is also recommended that future studies address the aforementioned methodological limitations. Sample sizes need to be power-calculated to ensure that there is sufficient power to detect the impact of the intervention if this exists. A measure of defusion needs to be used alongside study-specific outcome measures. To proclaim the effectiveness of cognitive defusion, improvements in outcome measures should be in line with improvements in defusion. Linked to this is the need to assess whether the allocated therapeutic technique has

been utilised and, in fact, that it has been utilised correctly. It is also advised that the researchers measuring outcomes are blinded to the participants' condition to eliminate any researcher bias. Future studies can improve on the sampling methods used and the clarity in reporting these. For instance, the samples selected need to be representative of the population, and the proportion of those asked to participate in the study, as well as the facilities in which the interventions took place, need to be clearly reported. These conditions would allow the generalisation of findings to the population that the sample was derived from. The samples used within this review were predominantly students; the knowledge on the effectiveness of cognitive defusion in clinical populations is limited, and this can be addressed within future studies. One further consideration is the outcomes measures used. Participant emotional distress has often been utilised as an outcome measure. However, one can argue that this is not in line with the ACT model, which views distress as part of life and does not aim to reduce symptoms directly (Harris, 2006). According to ACT, distress would be viewed as problematic only if it hindered value-directed living. Therefore, from a theoretical stance, a distress measure alone may not be true to the model. Moreover, many studies so far have exclusively relied on self-report outcome measures despite the inherent limitations of these. More reliable ways of measuring outcomes may include the use of implicit measures or the use of behavioural measures, as some of the studies have done, and quality of life measures. This would be in line with ACT theory, which has been described as a behavioural model. One can argue that no intervention is truly effective if any acquired benefits are not transferred into the person's behaviour and quality of life.

6.5 Strengths and limitations of current review

The main limitation of the current review has been the lack of statistical combination of study results in a meta-analysis. This has not been feasible due to the great methodological heterogeneity of the studies. Within the search strategy, the word ‘defusion’ was used to identify papers for inclusion in the review. However, it is possible that the use of the word ‘fusion’ as a search term, could have produced papers exploring the effectiveness of defusion techniques in order to reduce fusion. It is, therefore, possible that some studies on defusion may have been missed. The inclusion criteria indicated English language as a prerequisite for inclusion in the review. This resulted in the exclusion of 9 studies; therefore, the interventions examined, the methodology and conclusions of these studies could not be perused. It is not clear what effect the inclusion of these studies may have had on the conclusions of this review.

Conversely, the methodological clarity and transparency of the review are strengths, as this makes replication possible. The use of a quality framework facilitated the production of a comparative profile of the studies’ strengths and weaknesses. This, in turn, allowed an objective interpretation of the studies’ findings. In particular, the quality criteria checklist used, by Downs and Black (1998), was flexible enough to allow the review of both randomised and non-randomised studies, as some of the papers in this review did not clarify this in their methodology. The checklist helped discriminate between the studies and identify those with more robust methodology. Most importantly, it helped identify common strengths and weaknesses across the studies, which highlighted limitations within the current literature.

6.6 Conclusion

The great methodological heterogeneity amongst the identified studies and the methodological limitations moderate the robustness of any conclusions.

Cognitive defusion was found to be at least as effective as the comparative therapeutic approaches within the specific samples. This, however, is based on the assumption that changes in cognitive defusion mediated outcome improvements, and this was not measured.

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CHAPTER 2

EMPIRICAL PAPER

COGNITIVE FUSION AND SELF-AS-CONTENT

IN

PEOPLE WITH PERSISTENT PAIN

Abstract

Background: The aim of Acceptance and Commitment Therapy is to increase psychological flexibility by changing the function, context and one's relationship to one's own distressing internal events. Compromised psychological flexibility is believed to be linked to the interaction of six pathological processes, two of which are cognitive fusion and the self-as-content. These two processes are interrelated, and fusion with one's self-referential thoughts is considered to lead to a compromised sense of self. Persistent pain is a difficult to treat, long-term physical condition believed to have a significant impact on one's sense of self.

Aims: The main aim of this study is to provide evidence that fusion with self-referential thoughts is linked to a compromised sense of self and psychological distress in people with persistent pain. It will also pilot a version of the Implicit Relational Assessment Procedure (IRAP), as an implicit measure of fusion with the self-as-content.

Method: Patients referred to the Pain Management Programme of a UK hospital were eligible for the study. 29 patients with persistent pain were recruited (N=25 females) with a mean age of 45.3 years ($SD = 12.39$), mean pain duration of 11.2 years ($SD = 7.03$), and a prevalent diagnosis of Fibromyalgia (41%). Participants completed a battery of self-report measures and the IRAP.

Results: Cognitive fusion was significantly associated with psychological distress ($r=.54$, $p=.00$), and self-esteem ($r=-.57$, $p=.00$). Self-esteem was negatively associated with psychological distress, ($r=-.56$, $p=.00$). Psychological inflexibility was associated with psychological distress, ($r=.62$, $p=.00$). Fusion and psychological inflexibility accounted for 41% of the variance of psychological distress ($R^2 = .41$, $F(2, 26) = 9.18$, $p=.00$), and the

AAQ-II was found to be a significant predictor ($\beta=.472, p= .03$). High attrition was observed in the IRAP.

Conclusions: The primary hypotheses of the study were confirmed. No conclusions can be drawn from the use of the IRAP due to unusually high attrition. Clinical implications, limitations of the study and suggestions for future research are discussed.

1. Introduction

1.1 Acceptance and Commitment Therapy

Acceptance and Commitment Therapy (ACT) is one of the, so called, Third Wave Therapies (Hayes, 2004). ACT is philosophically grounded in functional contextualism and theoretically grounded in Relational Frame Theory (Hayes et al., 2012). Functional contextualism, in simple terms, is concerned with the function and context of any event or behaviour (Hayes et al., 2012). Function is understood as the impact of an event or behaviour, whereas the context refers to the circumstances within which said event or behaviour occurs (Bennett & Oliver, 2019). Both function and context are integral in developing an understanding of one's behaviour and, within functional contextualism, separating the two is viewed as nonsensical (Bennett & Oliver, 2019). ACT, therefore, is concerned with the function of one's unwanted internal events and the context within which these take place. From an ACT perspective, the content or the 'truth' of internal events is seen as unimportant (Bennett & Oliver, 2019; Hayes et al., 2012).

Relational Frame Theory (RFT; Hayes et al., 2001) is a behaviour analytic theory explaining the link between cognition, language, and human behaviour (Hayes et al., 2003). RFT explains the human ability to draw relations between stimuli (Blackledge, 2003), as all human cognition is considered to be the product of relating stimuli (Hayes et al., 2011). In the early stages of cognitive and language development, a young child is explicitly and repeatedly taught the relation *A equals B*, and the opposite relation *B equals A*. For instance, *this is an apple*, and *an apple is this*. After sufficient training in this, when the child is presented with the relation *C equals D*, the child is able to derive the relation *D equals C* without further training. It is this ability that the learning of language is based on (Blackledge, 2003). Once learned, however, this new skill becomes so well-

established that it leads to relating stimuli arbitrarily, and the development of very complex relational networks (Hayes & Gifford, 1997). Language now facilitates the human ability to “relate anything to anything” (Bennett & Oliver, 2019, p. 31). For instance, if one is afraid of dogs and one has heard a dog owner talk about walking their dog off the lead in a park, one can instantly relate the stimuli ‘dog’, ‘park’ and ‘fear’ in this way: dog = park = fear. This relational frame, in turn, may have an impact on one’s behaviour and may, for example, lead to one’s avoidance of going to parks. RFT considers the ability of arbitrarily relating stimuli to be at the core of human suffering (Blackledge, 2003), as one is not able to bypass one’s own relational networks (Bennett & Oliver, 2019).

1.1.1 Psychological flexibility and processes

Psychological flexibility is at the core of ACT and is described as one’s ability to stay in contact with one’s present experiences, whatever these may be, whilst pursuing value-directed action (Hayes et al., 2006). Within ACT, compromised psychological flexibility, or psychological inflexibility, is the result of six pathological processes (Figure 4) (Harris, 2009) and is thought to be linked to human suffering, poor psychological outcomes, and psychological distress (Masuda et al., 2011; Mendoza et al., 2018). The main aim of ACT is not to rid oneself of one’s unwanted or distressing internal events, but to increase one’s psychological flexibility through changing the function and context of said internal events (Hayes et al., 2012).

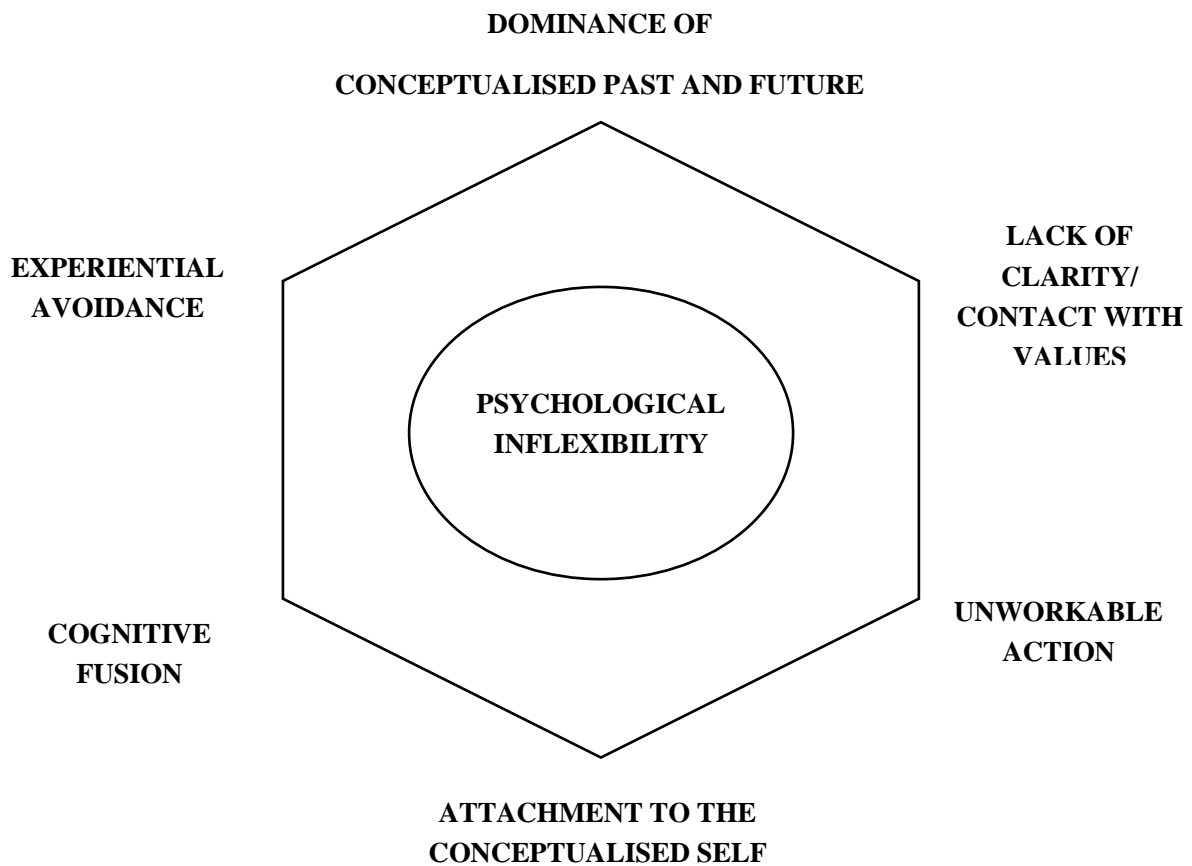


Figure 4. The ACT model of psychopathology (Harris, 2009)

Psychological flexibility is dependent on the interaction of six processes; Acceptance, Defusion, Contact with the Present Moment, Self-as-Context, Values, and Value-directed Action (Harris, 2009). These are diagrammatically presented in the ACT hexaflex (Figure 5).

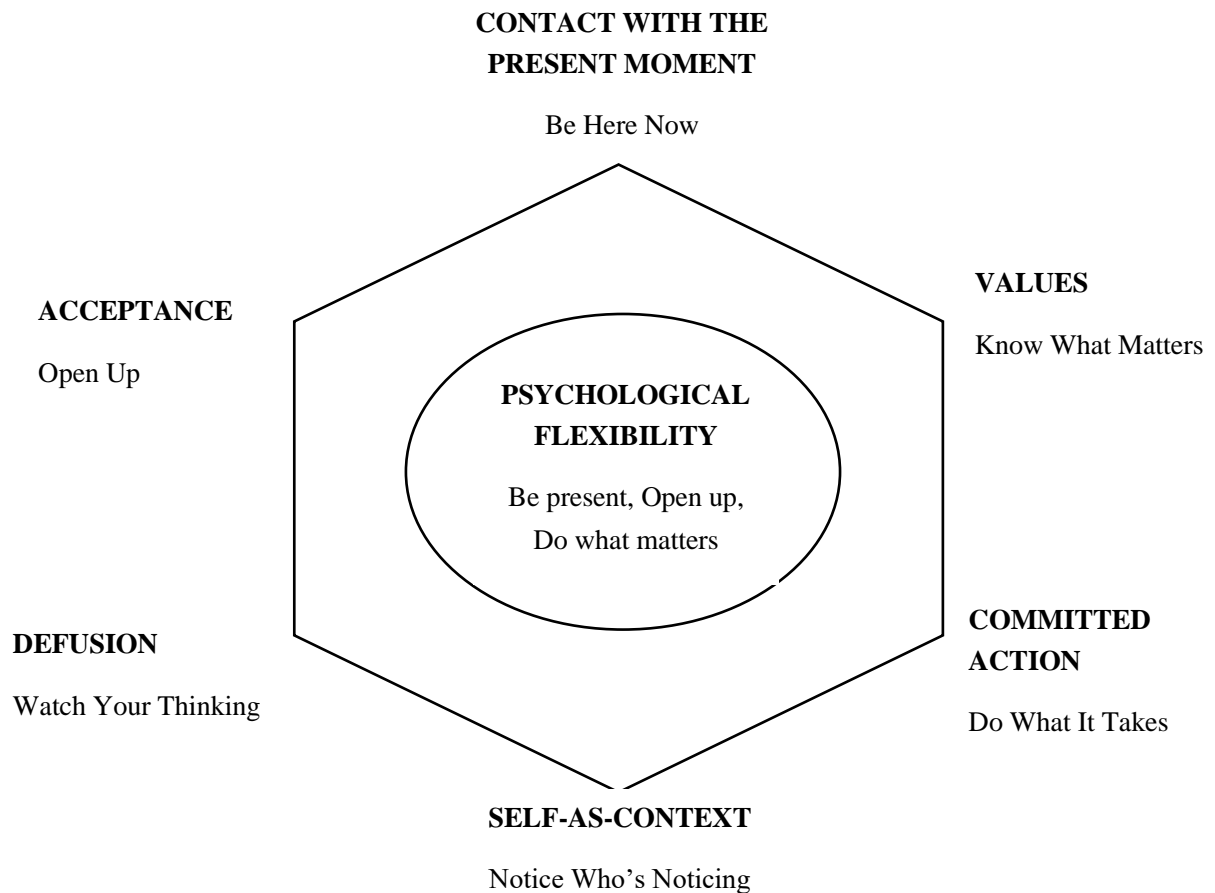


Figure 5. The ACT hexaflex (adapted from Harris, 2009)

1.2 Cognitive fusion, cognitive defusion and the self

There is great overlap between cognitive defusion and self-as-context within ACT (Foody et al., 2013), the reverse processes to fusion and self-as-content (Harris, 2009).

RFT explains that as the ability to derive relational frames develops, one will inevitably develop relational frames about oneself (Bennett, 2017). These relational frames, sometimes in the form of judgements about oneself, will often be made outside one's awareness in the present moment, and will be accepted as the absolute truth. "One will start relating to one's own relating" (Bennett, 2017, p. 9). Foody (2013) suggests that

becoming attached to or ‘fusing’ with the content of one’s self-related thoughts (or self-related relational frames) leads to a compromised sense of ‘self’. In ACT terms, this is referred to as the self-as-content or conceptualised self (Luoma et al., 2007). Cognitive defusion refers to the process of detaching oneself from the content of one’s thoughts and reducing the control that this content may place on one’s behaviour (Harris, 2009; Hayes, 2006).

ACT utilises a number of therapeutic techniques to help clients change the context of distressing thoughts and feelings, so that they can move towards, what is called, the self-as-context (Luciano et al., 2011). Self-as-context, or the observing self, leads to a transcendent sense of self. From this perspective, one is able to see oneself as the space wherein all internal events take place. That is, one does not coordinate one’s sense of self with the content or meaning of one’s thoughts and feelings. Instead, these are seen as transient events that take place within the self (Harris, 2009; Hayes, 2006).

The therapeutic techniques used to facilitate the emergence of self-as-context are based, according to RFT, on deictic relations (McHugh, 2015). RFT talks about three different types of deictic relations. Namely, I-YOU (interpersonal), HERE-THERE (spatial), and NOW-THEN (temporal) (Foody et al., 2013; McHugh, 2015). These relational frames are interdependent with one’s ability to distinguish between one’s behaviour and another’s (I versus YOU), and to locate one’s behaviour spatially (HERE not THERE) and temporally (NOW not THEN) (McHugh, 2015). These relations are learned through repeated training. That is, a young child must learn to distinguish between their own experience, I/ HERE/NOW, and the experience of another, YOU/THERE/THEN (Atkins & Styles,

2016). According to RFT, one's sense of self is based on these relations (Foody et al., 2013).

1.3 Persistent pain

Persistent pain is clinically defined as a pain that has persisted beyond the typical time for healing and/or for longer than three months (Marcus et al., 2009). The financial cost of persistent pain in Western countries is equivalent to the total cost of cancer and diabetes (Moseley & Vlaeyen, 2015). 14 million people in England are estimated to be living with persistent pain, resulting in close to five million GP appointments a year (Chronic Pain Policy Coalition, 2015). 60% of people will continue to live with persistent pain a year after its first occurrence, which suggests that treatment of persistent pain is challenging (Moseley & Vlaeyen, 2015). The impact of persistent pain is significant to one's quality of life, social environment, the workforce and the NHS (Chronic Pain Policy Coalition, 2015).

1.3.1 The biopsychosocial model of pain

In acute pain, the experience of pain signals the presence of tissue damage, which is vital for survival (Silva, 2014). Pain is the body's alarm system, which forces the sufferer to take action to prevent further harm (Silva, 2014). However, in the case of persistent pain, the pain persists after healing has been completed (The British Pain Society, 2015). As our understanding of persistent pain constantly evolves, currently it is understood that signals travel from the affected part of the body to the spine and through the spine to the

brain. The pain signal and the severity of the threat are then believed to be assessed by different parts of the brain, including the centres for emotions, past experiences, sleep and appetite. The brain, in turn, is thought to send a signal back to the spine, which ‘turns up’ or ‘turns down’ the experience of pain (The British Pain Society, 2015). This threat transition system can, however, become oversensitive and ‘overprotective’ overtime, which can result in increased threat messages being transmitted through the spinal cord and an increased experience of pain (Moseley & Butler, 2015).

The biopsychosocial model of pain, adapted from Engel’s biopsychosocial model (Engel, 1977), acknowledges and highlights the importance of the complex interaction of physiological, psychological and social factors in one’s experience of pain (Dougall & Gatchel, 2013). As Silva (2014) succinctly explains, “Not everybody feels pain the same way” (p.1).

1.3.2 Persistent pain and the self

Persistent pain is thought to have a significant impact on the sufferer’s sense of self, sense of identity and roles (Harris et al., 2003). People with persistent pain have been found to experience role loss, closely linked to one’s sense of self, within different life areas, such as friendship, occupation and leisure (Harris et al., 2003). This, in turn, has an impact on one’s adjustment to persistent pain (Kwok et al., 2016). The self is considered an important process in developing effective psychological therapies for persistent pain (Yu et al., 2015). However, there is great heterogeneity within the literature on the self, which is partly due to the wide variation in defining the concept of self.

In a systematic review, Yu et al. (2015) identified fifty-four studies that had explored fifteen different self-related variables in persistent pain, with self-esteem being the most

studied amongst these. Higher levels of self-esteem were associated with better adjustment to disease and lower psychological distress in patients with rheumatoid arthritis (Nagyova et al., 2005). Self-esteem was also identified, in the same study, as an important link between pain and psychological well-being. Garcia-Martinez et al. (2012) found that improved self-esteem was associated with health-related quality of life in patients with fibromyalgia and concluded that self-esteem may be a moderating factor between impact of illness and psychological distress. Waters et al. (2004) found that large discrepancies between one's actual self (i.e. how one conceptualises oneself) and the ideal self (i.e. how one wishes one would be) were associated with depression and psychological distress in patients with low back pain. This relationship may be mediated by psychological flexibility (Kwok et al., 2016). From an ACT perspective, these, and most self-related concepts within the review, are aspects of the self-as-content. The self-as-context was the focus of only very few studies. The existing, albeit limited, evidence on the self-as-context suggests that this sense of self is associated with psychological wellbeing and improved physical functioning in persistent pain (Yu et al., 2015). The self-as-context has also been linked to decreased pain-related interference and depression, and work and social adjustment (Yu et al., 2017).

Yu et al. (2017) suggest that ACT and the concept of self within the psychological flexibility model lends itself well to organising future research on the self and persistent pain. Yu and McCracken (2016) regard the clear distinction between self-as-content and self-as-context, as conceptualised within ACT, as imperative in future research into the self and persistent pain.

1.4 Aims and hypotheses of the present study

1.4.1 Primary aims

According to ACT, fusing with the content of one's self-referential thoughts and emotions leads to a compromised sense of self (Foody et al., 2013) and is linked to psychological inflexibility (Gil-Luciano et al., 2016). The main aim of the present study is to provide experimental evidence for this standpoint, which is lacking in the literature. It will endeavour to assess whether people with persistent pain, who fuse with their thoughts, experience a compromised sense of self, as expressed through low self-esteem, and high psychological distress. More specifically, it seeks to answer the following questions:

- Is cognitive fusion in people with persistent pain associated with psychological distress and self-esteem?
- Is psychological inflexibility in people with persistent pain associated with psychological distress?
- Is self-esteem in people with persistent pain associated with psychological distress?
- Is cognitive fusion, psychological inflexibility or self-esteem a better predictor of psychological distress in people with persistent pain?

We are hypothesising the following:

- People with persistent pain who experience higher fusion with their self-related thoughts will experience higher psychological distress and lower self-esteem (Hypothesis 1).

- People with persistent pain who experience higher psychological inflexibility will experience higher distress (Hypothesis 2).
- People with persistent pain who experience lower self-esteem will experience higher psychological distress (Hypothesis 3).
- The last aim of the study is exploratory and so, no formal hypothesis is being made.

Confirmation of the above hypotheses will identify areas of potential therapeutic work with people with persistent pain and will provide supporting evidence for the use of ACT-consistent therapeutic techniques (i.e. defusion and self-as-context). Alternatively, it may provide evidence for the use of self-esteem work.

1.4.2 Secondary aim

A secondary aim of the present study is to address a common limitation within most psychological research. Namely, the reliance on self-report measures as a method of assessment, as these can be sensitive to bias (Scott et al., 2016; Wetherell et al., 2011). The Implicit Relational Assessment Procedure (IRAP; Barnes-Holmes et al., 2006) has been developed as an alternative way of measuring beliefs and attitudes, which may allow researchers to bypass participants' conscious or unconscious efforts to present themselves in a certain way. This study will utilise a version of the IRAP in addition to traditional self-report questionnaires to assess fusion with actual versus ideal self-statements in people with persistent pain. To our knowledge, the IRAP has not been used with this population. Therefore, the secondary aim is:

- To pilot the IRAP as a measure of fusion with the self-as-content in people with persistent pain.

As this is a pilot, no formal hypotheses are being made. High coordination with both actual and ideal self-statements would suggest high ‘fusion’ with the self-as-content. Based on the findings of another study into the actual vs ideal self (Remue et al., 2014), through the use of the IRAP, a tentative hypothesis may be that people with persistent pain who endorse more ideal rather than actual self-statements, are likely to experience higher psychological distress (Hypothesis 4).

2. Method

2.1 Inclusion and exclusion criteria

The inclusion and exclusion criteria for the present study can be found in Table 5.

Table 5: Inclusion and exclusion criteria

Inclusion/ exclusion criteria
Inclusion criteria:
<ul style="list-style-type: none">• Referral to the Pain Management Programme• Adults (over 18 years of age)• Ability to understand, read and respond in English
Exclusion criteria:
<ul style="list-style-type: none">• Significant cognitive impairment• Pain affecting the hands• Lack of ability to provide informed consent to participate in the study• Current psychotic symptoms

2.2 Sample

Ethical approval was awarded by the National Health Service Research Ethics Committee (Appendix 2). Patients referred to the Pain Management Programme of a UK Hospital were informed of the study and offered the opportunity to participate. 29 participants were recruited and were required to attend an assessment appointment with the Chief Investigator. The assessment lasted approximately 45-60 minutes. Participants were given a reimbursement of £5 for their participation in the study. The participants' demographic information is presented in Table 6. Participants had a mean age of 45,3 years (SD=12.39), ranging from 23 to 66 years. The mean pain duration in years was 11.2 (SD=7.03), ranging from 2 to 30 years, and the location of the pain varied.

Table 6: Participant demographic information

Sample Demographic information		
Gender	N	%
Males	4	13.8%
Females	25	86.2%
Ethnicity		
White British	24	82.7%
British Pakistani	1	3.44%
British Indian	1	3.44%
British Black Caribbean	1	3.44%
Mixed White British and Black Caribbean	1	3.44%
Pain location		
Whole body (Fibromyalgia)	12	41.4%
Whole body (Systemic sclerosis)	1	3.44%
Back	5	17.5%
Pelvic floor	2	6.88%
Neck and shoulders	2	6.88%
Face and head (incl. migraines)	2	6.88%
Abdomen	2	6.88%
Knee	1	3.44%
Joint and leg	1	3.44%
Multiple site	1	3.44%

2.3 Measures

The following explicit and implicit measures were used in this study (Appendix 6).

2.3.1 The Rosenberg Self-Esteem scale

The Rosenberg Self-Esteem Scale (RSES) is a 10-item self-report scale measuring global self-worth by assessing positive and negative feelings about the self (Rosenberg, 1965).

The items are answered on a four-point Likert-type scale from 'Strongly Agree' to 'Strongly Disagree'. Higher obtained scores suggest higher self-esteem (Rosenberg, 1965). The internal consistency of the RSE is .77 (Rosenberg, 1965).

2.3.2 The Depression Anxiety Stress Scales-21

The Depression Anxiety Stress Scales-21 (DASS-21; Henry & Crawford, 2005) is the short-form version of the original Depression Anxiety Stress Scale (Lovibond & Lovibond, 1995). It comprises of three 7-item scales, Depression, Anxiety, and Stress. All items are answered on a four-point scale, ranging from 'It did not apply to me at all' to 'Applied to me very much or most of the time'. The DASS-21 can be used as a self-report measure of psychological distress. Higher scores suggest higher distress in the three scales (Henry & Crawford, 2005). The internal consistencies for the three scales are: .88 for Depression, .82 for Anxiety, and .90 for Stress. The internal consistency for the Total scale is .93 (Henry & Crawford, 2005).

2.3.3 The Cognitive Fusion Questionnaire

The Cognitive Fusion Scale (CFQ; Gillanders et al., 2014) is a brief self-report measure of cognitive fusion. The CFQ consists of 7 items, scored on a 7-point scale, ranging from 'Never True' to 'Always True'. Higher scores suggest higher levels of cognitive fusion. The CFQ has been reported to have an internal consistency of .87 (McCracken et al., 2014).

2.3.4 The Acceptance and Action Questionnaire- II

The Acceptance and Action Questionnaire-II (AAQ-II; Bond et al., 2011) is a 7-item self-report questionnaire measuring psychological inflexibility and experiential avoidance. All items are answered on a 7-point scale, ranging from 'Never True' to 'Always True'. Higher scores indicate greater psychological inflexibility. The AAQ-II is reported to have an internal consistency of .84 (Bond et al., 2011).

2.3.5 The Marlowe-Crowne Social Desirability Scale

The Marlow- Crowne Social Desirability Scale (MC-SDS; Crowne & Marlowe, 1960) is a 33-item self-report scale that measures one's tendency towards social desirability in responding. All items are responded to as 'True' or 'False'. Higher scores indicate a higher degree of concern for the social desirability of one's responses. High scores may also indicate one's tendency to conform to social rules (Crowne & Marlowe, 1960). The MC-SDS has an internal consistency of .79 (Beretvas et al., 2002).

2.3.6 The Implicit Relational Assessment Procedure

One can often not be aware of one's own implicit beliefs or attitudes or may indeed, consciously or unconsciously, make efforts to present these in a certain way (Barnes-Holmes et al., 2006). The Implicit Relational Assessment Procedure is a computer-based task, which aims to assess implicit beliefs, or 'implicit stimulus relations' in RFT terms. Participants are required to respond as quickly and accurately as possible, and their response latencies are a representation of their held beliefs. This is based on the tested hypothesis that participants' response latencies to stimulus relations consistent with their beliefs will be shorter (Barnes-Holmes et al., 2006).

The version of the IRAP used in the present study is being piloted to assess coordination of the self with actual versus ideal self-statements; that is, fusion with the conceptualised self. The software programme was downloaded from <http://irapresearch.org>. The procedure described below is similar to Remue et al. (2013). Unlike Remue et al. (2013) however, in this version, the actual and ideal selves were measured within one IRAP task. Participants were presented with a target statement ('I am' or 'I want to be') at the top of the screen and one of the target words in the middle of the screen (Figure 6).

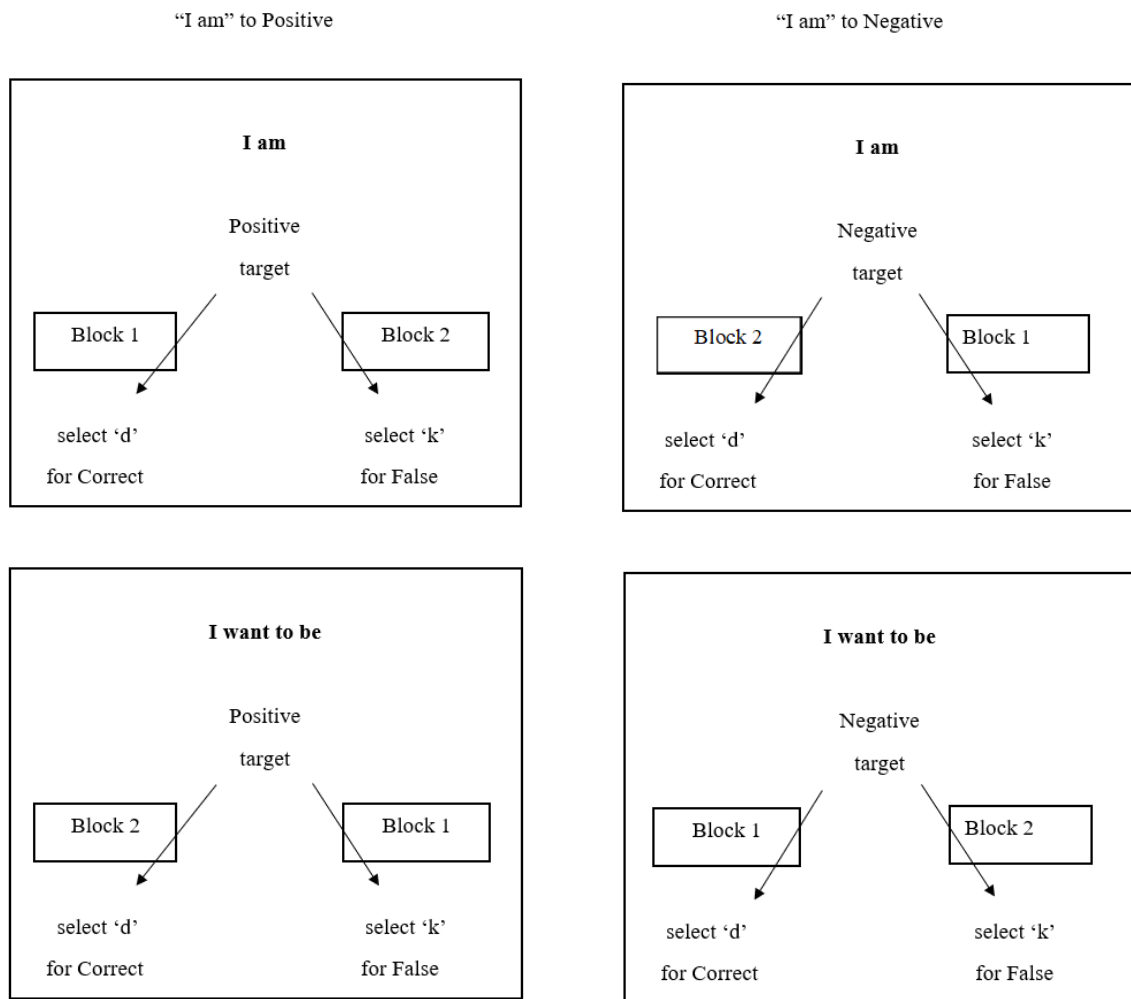


Figure 6. Four trial types in the Actual vs Ideal Self IRAP

Table 7 presents the list of target statements and words, which is a replication of the stimulus set of Remue et al. (2013). Participants were required to respond to the presented relation (i.e. I am-Competent) by pressing the correct ('D' key) or false key ('K' key) on the keyboard. The pre-assigned correct and incorrect responses alternated between blocks. For instance, the relation 'I am-Competent' would be correct in Block 1 and incorrect in Block 2.

Table 7: Target statements and target words for the Actual vs Ideal Self IRAP

Target statements		Target words	
Actual self	Ideal self	Positive	Negative
I am	I want to be	Happy	Sad
		Competent	Failure
		Hopeful	Hopeless
		Tender	Guilty
		Valuable	Rejected
		Friendly	Desperate

In Block 1 (consistent block), participants were required to respond with ‘correct’ in the trials expressing actual self- positive and ideal self-negative. In Block 2 (inconsistent block), participants were required to respond with ‘correct’ in the trials expressing actual self-negative and ideal self-positive. The IRAP included a maximum of 8 practice blocks and a maximum of 6 test blocks, with 24 trials in each block. There was a 3000ms interval between trials. The order, in which Blocks 1 and 2 were presented, was counterbalanced across participants. Accuracy and mean latency criteria were set at 70% and 3000ms respectively. Participants needed to meet these criteria for both Blocks 1 and 2 within the practice, in order to continue onto the test blocks. Participants who did not achieve these criteria across the practice pairs of blocks did not proceed to the test blocks and were excluded from the analyses.

2.4 The experimental procedure

Potential participants referred to the Pain Management Programme were informed of the study and provided with a Participant Information Sheet (Appendix 4). The potential participants, who provided verbal consent, were contacted by phone or email by the Chief Investigator. Information on the study was reiterated and an appropriate appointment for the assessment was arranged with the participants, who decided to partake. All assessments took place at the Hospital, where patients attended for treatment.

Upon arrival, participants were given the written consent form (Appendix 5) to sign and were advised that they had the right to withdraw at any point. Following this, the process was explained, and participants were given the opportunity to ask questions; then, the assessment commenced. The assessment lasted between 45 to 60 minutes. Participants first completed a Demographics form, then the written questionnaires and finally the IRAP. This order was held constant, as a previous meta-analysis has shown that the order of presentation of implicit and explicit measures does not affect correlations (Hofmann et al., 2005). Participants were offered the opportunity to take a break during the assessment if one was needed. Once the questionnaires were completed, a laptop with the IRAP was presented and instructions for the task were given (Appendix 7). At the end of the assessment, participants were offered the opportunity to ask any questions about the process and/or the study. Participants were given a reimbursement of £5 for their participation.

3. Results

3.1 Explicit data analysis strategy

The data from the self-report questionnaires were analysed to test Hypotheses 1, 2 and 3. SPSS version 24 (IBM Corp, 2016) was used for data analysis. Pearson's *r* correlation coefficient was calculated to explore associations between the variables of cognitive fusion, psychological inflexibility, psychological distress, self-esteem, and social desirability (Hypotheses 1, 2 and 3). Secondly, a hierarchical regression analysis was run to explore whether cognitive fusion, psychological inflexibility or self-esteem is a better predictor of psychological distress in people with persistent pain (4th aim).

3.1.1 Pearson's *r* correlations

Preliminary analyses were performed, and the data set met the criteria for linearity and homoscedasticity (Field, 2013); therefore, Pearson's *r* coefficient was used. Table 8 presents the means and standard deviations for the explicit measures.

Table 8: Descriptive statistics for the explicit measures

	Mean	Standard Deviation	N
CFQ	28.14	12.87	29
RSES	14.48	6.20	29
DASS-21	57.86	25.64	29
DASS- D	18.06	10.60	29
DASS- A	17.72	10.23	29
DASS-S	22.06	9.74	29
AAQ-II	26.51	12.17	29
MC-SDS	18.20	6.82	29

CFQ= Cognitive Fusion Questionnaire; RSES= Rosenberg Self-Esteem Scale;
DASS-21= Depression, Anxiety and Stress Scales-21;
DASS-D= Depression, Anxiety and Stress Scales- Depression; DASS-A= Depression, Anxiety and Stress Scales- Anxiety; DASS-S= Depression, Anxiety and Stress Scales-Stress;
AAQ-II= Acceptance and Action Questionnaire; MC-SDS= Marlowe-Crowne Social Desirability Scale

Table 9 presents the correlations between participants' scores on the Cognitive Fusion Questionnaire, the Rosenberg Self-Esteem Scale, the Depression Anxiety Stress Scales-21 (Total, Depression, Anxiety, and Stress), the Acceptance and Action Questionnaire-II, and the Marlowe-Crowne Social Desirability Scale. Cognitive fusion was significantly associated with psychological distress, $r=.54$, $p=.002$, including all three subscales, with higher fusion being linked to higher distress. A significant negative association was found between cognitive fusion and self-esteem, $r=-.57$, $p=.001$, with higher fusion associated with lower self-esteem. These two findings support Hypothesis 1.

Psychological inflexibility was found to be strongly associated with psychological distress, $r=.62$, $p=.000$, including all three subscales, with greater psychological inflexibility being associated with higher psychological distress. This supports

Hypothesis 2. A strong negative association between psychological inflexibility and self-esteem was also found, $r = -.81, p = .00$, with higher inflexibility indicating lower self-esteem. Self-esteem was found to be negatively associated with psychological distress, $r = -.56, p = .001$, with lower self-esteem being associated with higher distress. The Depression subscale showed the largest correlation of the three, $r = .63, p = .00$. This finding supports Hypothesis 3. The mean score for socially desirable responding fell within the average range, and was not found to be significantly associated with any other variables. The association of the self-report questionnaires with the variables of age, gender, ethnicity, pain duration and pain location were also examined, and were all insignificant (all p 's $> .99$).

Table 9. Correlations between the explicit measures

	FSQ	RSE	DASS	DASSD	DASSA	DASSS	AAQ	MC-DS
FSQ		-.57**	.54**	.56**	.36*	.43*	.68**	-.15
RSE			-.56**	-.63**	-.38*	-.38*	-.81**	.10
DASS21				.79**	.88**	.83**	.62**	-0.1
DASS_D					.54**	.44*	.59**	.04
DASS_A						.68**	.44*	.03
DASS_S							.52**	-.13
AAQ								-.02
MC-DS								

CFQ= Cognitive Fusion Questionnaire; RSES= Rosenberg Self-Esteem Scale;
DASS-21= Depression, Anxiety and Stress Scales-21;
DASS-D= Depression, Anxiety and Stress Scales- Depression; DASS-A= Depression, Anxiety and Stress Scales- Anxiety; DASS-S= Depression, Anxiety and Stress Scales-Stress;
AAQ-II= Acceptance and Action Questionnaire; MC-SDS= Marlowe-Crowne Social Desirability Scale

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

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

3.1.2 Regression analysis

A hierarchical regression analysis was run to explore whether cognitive fusion, psychological inflexibility or self-esteem can predict psychological distress in people with persistent pain (4th aim). Cognitive fusion and psychological inflexibility were entered at Step 1 and self-esteem was entered at Step 2 (Table 10). Fusion and psychological inflexibility accounted for 41% of the variance of psychological distress ($R^2 = .41$, $F(2, 26) = 9.18$, $p = .001$), and the AAQ-II was found to be a significant predictor ($\beta = .47$, $p = .03$) indicating that higher psychological inflexibility was significantly associated with higher distress. Entering self-esteem at Step 2 of the model, accounted for only an additional .8% of the variance.

Table 10. Hierarchical regression findings

	B	SE	β	R^2
Step 1				
CFQ	.43	.41	.22	
AAQ-II	.99	.43	.47*	.41
Step 2				
CFQ	.42	.41	.21	
AAQ-II	.73	.62	.34	
RSE	-.64	1.08	-.15	.42

CFQ= Cognitive Fusion Questionnaire; RSES= Rosenberg Self-Esteem Scale;
 DASS-21= Depression, Anxiety and Stress Scales-21;
 DASS-D= Depression, Anxiety and Stress Scales- Depression; DASS-A= Depression, Anxiety and Stress Scales- Anxiety; DASS-S= Depression, Anxiety and Stress Scales-Stress;
 AAQ-II= Acceptance and Action Questionnaire; MC-SDS= Marlowe-Crowne Social Desirability Scale

* Significance at $p < .05$

3.2 Implicit data analysis strategy (IRAP)

3.2.1 IRAP completion

Participants' data on the IRAP were only included in the analyses if they met the IRAP accuracy (70%) and latency (3000ms) criteria. Any participants who progressed onto the test blocks but failed to meet the criteria in more than one block were excluded from the analyses. Only 6 of the 29 participants succeeded in meeting the criteria. Therefore, attrition was at 79.3%.

3.2.2 IRAP completers vs non-completers

Independent *t*-tests were run to compare the differences in pain duration and the explicit measures between the IRAP completers and non-completers (Table 11). No significant differences were found (all *p*'s>.300). A chi-square analysis was also run to compare the differences in gender, ethnicity and pain location (See Table 6 for Demographics). No significant differences were found (all *p*'s>.158).

However, as can be seen in Table 11, the completers and non-completers seem to differ in their acquired scores on the DASS-21 ($M = 46$ vs $M=60.95$). Particularly noticeable is the difference in the subscales of Anxiety ($M = 12.66$ vs $M =19.04$), and Stress ($M = 18.33$ vs $M = 23.04$) indicating that non-completers reported higher levels of anxiety and stress.

Table 11. Descriptive statistics for IRAP completers and non-completers

	Completers		Non-completers	
	N		N	
	6 (20.7%)		23 (79.3%)	
	Mean	Std. Deviation	Mean	Std. Deviation
Pain duration	11.00	6.03	11.23	7.39
FSQ	28.16	12.90	28.13	13.15
RSE	12.83	5.81	14.91	6.35
DASS21	46.00	30.11	60.95	24.12
DASS_D	15.00	12.69	18.86	10.15
DASS_A	12.66	9.60	19.04	10.17
DASS_S	18.33	8.43	23.04	9.99
AAQ	27.50	12.95	26.26	12.25
MC-DS	11.16	7.46	20.04	5.43

CFQ= Cognitive Fusion Questionnaire; RSES= Rosenberg Self-Esteem Scale;
DASS-21= Depression, Anxiety and Stress Scales-21;
DASS-D= Depression, Anxiety and Stress Scales- Depression; DASS-A= Depression, Anxiety and Stress Scales- Anxiety; DASS-S= Depression, Anxiety and Stress Scales-Stress;
AAQ-II= Acceptance and Action Questionnaire; MC-SDS= Marlowe-Crowne Social Desirability Scale

3.2.3 IRAP data preparation

The process for data preparation described here has been slightly adapted from Remue et al. (2013), as the actual and ideal self are measured within one IRAP. In this version of the IRAP four trial types emerged; coordination of the actual self with positive target words (Actual-Good), coordination of the actual self with negative target words (Actual-Bad), coordination of the ideal self with positive target words (Ideal-Good), and coordination of the ideal self with negative target words (Ideal-Bad). The raw IRAP data produced by the computer task represent the participants' response latencies on each trial

measured in milliseconds. A D-IRAP algorithm (Vahey et al., 2009) has been developed, and was slightly adapted and used to produce four D-IRAP scores, one for each trial type. Each D-IRAP score represents the mean of the response latencies across all trials for each trial type. The higher the score, the higher the coordination with the actual or ideal self respectively.

3.2.4 IRAP results

6 participants only met the accuracy and latency criteria and were included in the analyses. Table 12 presents the descriptive statistics for the four trial types.

Table 12: Descriptive statistics for the four IRAP trial types

Trial type	N	Mean	Std. Deviation
Actual- Good	6	.34	.40
Actual- Bad	6	-.15	.51
Ideal- Good	6	.08	.26
Ideal- Bad	6	.04	.39

Pearson's r coefficient was used to explore any possible associations between the trial types and the self-report measures. No significant associations were found (all p 's > .066).

A repeated measures ANOVA was carried out to compare the D-IRAP scores across trial types for the 6 participants. This showed an effect for trial-type at the group level, which is approaching significance, $F(3,5) = 3.14, p = .05$. Figure 6 presents the mean D-IRAP scores across the trial types.

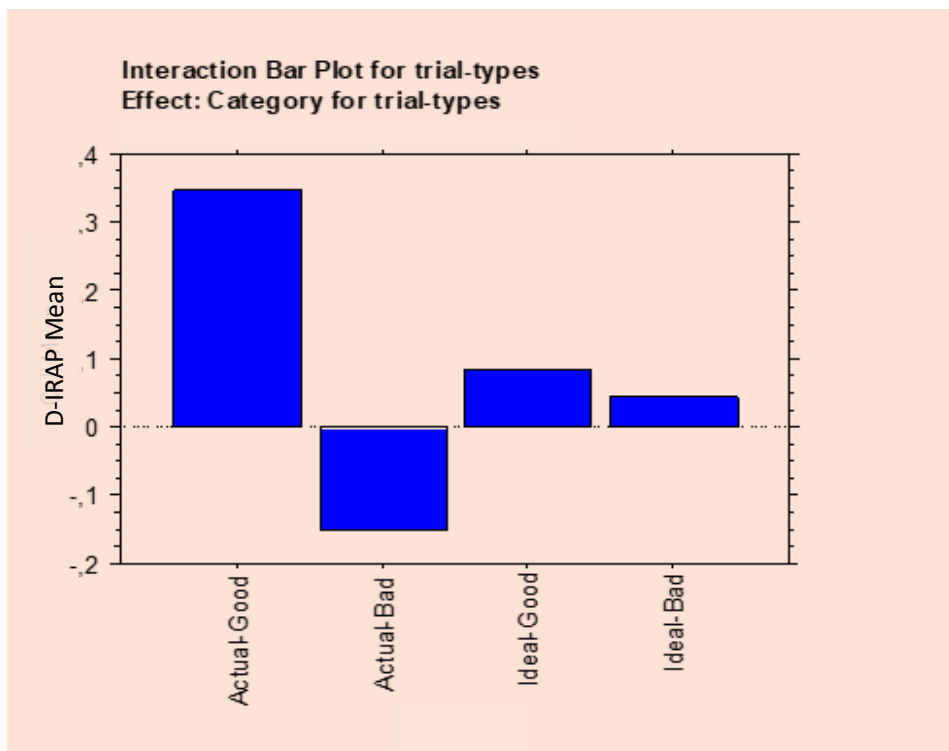


Figure 7. D-IRAP means for the four trial types

It can be observed in Figure 7 that the 6 participants coordinated with actual self- positive statements and this seems to be the largest effect. They also coordinated with actual self- negative statements but to a lesser degree. There was a small effect for ideal self-positive and negative statements, showing that the 6 participants did not greatly coordinate with these. Overall, the 6 participants coordinated more with the actual than ideal self, however, the difference is far from significant.

3.3 Adverse effects

One participant became distressed following completion of the IRAP. This was related to the content of the task, as links were made between some of the statements, life circumstances, and the difficulty in meeting the criteria for the task. Reassurance was

offered, and no further intervention was required. Another participant became anxious during assessment with the IRAP. It was suggested that the participant discontinued the task, as it was thought that the distress did not justify persisting with the assessment. The participant's anxiety quickly decreased once the task was discontinued and no further intervention was required.

4. Discussion

ACT suggests that the processes of cognitive fusion and self-as-content are linked to psychological inflexibility (Hayes et al., 2006) and the experience of psychological distress (Mendoza et al., 2018). Persistent pain is a complex and long-term physical health condition, which has a significant impact on one's life, environment, and social networks (Chronic Pain Policy Coalition, 2015). Individuals with persistent pain commonly experience psychological distress (Dany et al., 2016; Rice et al., 2016). The present study, firstly, aimed to explore whether fusing with one's self-referential thoughts is linked to psychological distress and psychological inflexibility in people with persistent pain, and a compromised sense of self, expressed through the report of low self-esteem. Secondly, it looked at whether self-esteem was linked to psychological distress. Thirdly, it aimed to explore whether cognitive fusion, psychological inflexibility and/ or self-esteem were better predictors of psychological distress in this sample. Finally, this study sought to trial an implicit assessment measure of self-as-content in the hope of improving upon the common limitations of self-report measures.

4.1 Self-report measures

The findings support the first three hypotheses of this study. As predicted by the ACT model, an association between cognitive fusion with self-referential thoughts, psychological inflexibility and psychological distress was found in this sample of people with persistent pain. High fusion was associated with high distress and low self-esteem, and low self-esteem was associated with high distress. High psychological inflexibility was associated with high distress and strongly associated with low self-esteem. A study by Duff et al. (2016) also reported that higher levels of cognitive fusion and psychological inflexibility were linked to higher levels of psychological distress in a non-clinical sample. The current findings suggest that this association exists in a clinical sample. The present study also confirms previous findings on the association between self-esteem and psychological distress (Garcia- Martinez et al., 2012; Nagyova et al., 2005). However, little is known about the relationship between cognitive fusion and self-esteem, and psychological inflexibility and self-esteem. The findings of this study suggest that cognitive fusion with self-referential thoughts and psychological inflexibility are two concepts related to self-esteem. As self-esteem is one way of assessing one's sense of self, we can propose that the findings offer experimental evidence in support of the standpoint that fusing with the content of one's self-referential thoughts is linked to a compromised sense of self (Foody et al., 2013).

Hierarchical regression analysis revealed that cognitive fusion and psychological inflexibility together explained 41% of the variance of psychological distress in this sample. When self-esteem was added to fusion and inflexibility, it only accounted for an

additional .8% of the variance. Only psychological inflexibility was found to be a significant predictor of psychological distress in this sample.

However, as the RSES measures self-esteem, defined as global self-worth, through positive and negative self-referential statements (e.g. “I certainly feel useless sometimes”), it is worth considering to what extent this indirectly measures fusion with self-referential thoughts. This view is supported by Yu et al. (2015), who characterised all studies measuring self-esteem as self-as-content studies. From an ACT perspective, high self-esteem is not favoured over low self-esteem. High self-esteem would suggest fusion with positive self-referential thoughts and one can argue that this can be equally problematic as fusing with negative self-referential thoughts. As suggested by Baumeister and Vohs (2018), the benefits of high self-esteem are far less extensive than previously thought, and raising one’s self-esteem does not directly lead to tangible life improvements. However, they do acknowledge that high self-esteem is linked to improved motivation and pleasant feelings about the self. This may be clarified by the distinction between secure and fragile self-esteem (Kernis et al., 2008). The authors propose that fragile high self-esteem includes positive feelings of self-worth, which are not stable, are sensitive to circumstances and external feedback, and as a result tend to easily fluctuate. It is suggested that fragile self-esteem is linked to difficulties in psychological functioning. It appears that there may be an overlap between the concept of fusion with self-referential thoughts and self-esteem; namely an overlap between what is measured by the CFQ and the RSES. This may partly explain why self-esteem was not found to explain much of the variance despite being associated with psychological distress.

4.2 IRAP

6 of 29 participants met the criteria of the IRAP and were included in the analyses.

Vahey, Nicholson and Barnes-Holmes (2015) found in a meta-analysis of criterion effects for the IRAP that a sample of 29-37 participants is needed to achieve sufficient statistical power. The sub-sample in the present study that met the criteria of the IRAP is too small (N=6) for any conclusions to be drawn.

Attrition for the IRAP in this study was observed at close to 80%. Attrition rates in previous studies have ranged between 15-22%, although attrition up to 50% has been reported (Nicholson et al., 2014). As such, the attrition in this sample can be described as uncommonly high and, therefore, various hypotheses that may explain this are considered.

Anxiety and stress impacting on performance

Research has demonstrated that specific populations, such as spider-phobic individuals and individuals with contamination-based Obsessive-Compulsive Disorder, may be more likely to fail to meet the IRAP criteria. One hypothesis is that participants may experience difficulty in disengaging their attention from the stimuli or may experience anxiety as a result of the content of the IRAP (Nicholson et al., 2014). Indeed, one participant in the present study expressed that some of the statements in the IRAP (i.e. I am Competent, I am a Failure) triggered emotional discomfort and another participant became visibly anxious and was asked to discontinue the task. We do not know whether other participants may have also experienced anxiety as a result of the content of the IRAP. As anxiety impairs cognitive ability and performance (Angelidis et al., 2019), it would possibly have an impact on the participants' ability to meet the IRAP criteria. However, it may not have been the content of the IRAP per se that evoked experienced

anxiety but, rather, that high levels of anxiety may have already been present in this group. Even though the comparison between completers and non-completers revealed no significant differences in the explicit measures scores, the difference between the acquired scores on the Anxiety and Stress subscales of the DASS-21 (Table 11) is noticeable. The non-completers scored higher on the subscales of anxiety and stress than the completers and this may have been an important contributing factor in the difficulty to meet the IRAP criteria.

Diagnosis of fibromyalgia

Fibromyalgia was a prevalent diagnosis amongst this group with 41% of participants having this condition. Fibromyalgia is a chronic condition affecting the whole body in the form of widespread muscular pain, fatigue, sleeping and cognitive difficulties (Campos & Vazquez, 2012; van Middendorp et al., 2016). There is continued uncertainty regarding the validity and aetiology of fibromyalgia (Furness et al., 2018), which has been associated with genetic, immunological, and hormonal factors (Bellatio et al., 2012), as well as traumatic life events, stress (Buskila et al., 2008), and psychological factors (van Middendorp et al., 2016). Psychological and personality characteristics associated with fibromyalgia have included neurotism, high negative affect combined with avoidant emotion regulation coping strategies (van Middendorp et al., 2016), and anxiety (Malin & Littlejohn, 2016). A study by Malin and Littlejohn (2016) suggests that stress is an important link between psychological factors and fibromyalgia symptoms.

As non-completers reported higher levels of anxiety and stress than completers of the IRAP, there may be a link between the high prevalence of fibromyalgia in this group and the difficulty to meet IRAP criteria.

Working memory deficits in people with persistent pain

The IRAP is demanding on working memory (Nicholson et al., 2014) and individuals with persistent pain have been found to present with memory deficits (Berryman et al., 2013). Specifically, persistent pain has been associated with decreased attention and decreased verbal working memory (Berryman et al., 2013), which may have affected participants' ability to meet the IRAP criteria. Possibly related to this is that the version of the IRAP utilised in this study assessed actual and ideal self within one task, unlike Remue et al. (2014), who delivered two separate IRAP tasks, an actual self IRAP and an ideal self IRAP. Despite this being a suggestion for future exploration by the authors, the combinations of concepts, target statements and words may have been too taxing for the participants' working memory, which is likely to display deficits as explained above.

Opioid treatment

The observed cognitive difficulties in this population may be partly linked to long-term opioid treatment, as supported by a study demonstrating that patients with persistent pain on long-term oral opioid treatment showed impaired attention, psychomotor speed, and working memory (Sjøgren et al., 2000). Another study looking at the long-term effects of opioid treatment in patients with chronic low back pain (Schiltenwolf et al., 2014) showed that in addition to impaired performance on working memory tasks, patients were found to display delayed information processing and reduced flexibility for concept change (Schiltenwolf et al., 2014). As individuals with persistent pain, especially those under multidisciplinary management, are often on high doses of pain medications including opioids (Giummarra et al., 2015), this finding is very relevant and may have had a direct effect on participants' ability to complete the IRAP.

4.3 Clinical implications

The findings of the present study offer evidence in support of ACT-consistent therapeutic techniques in clinical practice with people with persistent pain. Cognitive fusion with self-referential thoughts and psychological inflexibility were found to be associated with psychological distress and self-esteem in this sample of people with persistent pain, which suggests that this is an area for intervention. Cognitive defusion techniques have been shown to be at least as effective as alternative therapeutic techniques in improving outcomes, such as decreased thought-associated distress (Barrera et al., 2016), decrease in the frequency and believability of negative thoughts (Moffit et al., 2012), improved psychological functioning (Levin et al., 2018), and improved self-esteem (Hinton & Graynor, 2010). However, despite the overlap between cognitive defusion and self-as-context, less is known about the effectiveness of self-as-context techniques. Carasquillo and Zettle (2014) found that a self-as-context exercise especially adapted for the experience of pain was linked to significantly increased tolerance of induced pain.

Yet, if we consider that psychological inflexibility was identified as a predictor of psychological distress, might all six processes of the psychological flexibility model be central in the management of persistent pain? There is sufficient evidence to support the use of ACT interventions in persistent pain. Group-based ACT interventions have been shown to have a positive impact on functioning in patients with fibromyalgia (Luciano et al., 2014), and reduction in disability and psychological distress in patients with chronic headache (Mo'tamedi et al., 2012). An internet-based ACT intervention for persistent pain also had an impact on depression, pain intensity and psychological inflexibility (Trompetter et al., 2015). An ACT-based rehabilitation programme for patients with persistent pain had significant effects on functioning, pain acceptance, cognitive fusion,

and committed action, with psychological flexibility explaining some of the variance (Scott et al., 2016).

4.4 Limitations of the present study

The findings of the present study offer supporting evidence on the link between specific ACT processes and psychological distress, as predicted by the ACT model. However, the sample in this study (N=29) was relatively small and therefore any conclusions are to be made tentatively. Furthermore, a random sampling method was not utilised, which suggests that the ability to generalise the results to all patients with persistent pain seeking interventions is limited. Therefore, any offered conclusions apply to this sample only.

In terms of the IRAP, this study did not succeed in piloting this assessment measure in this population, primarily due to extremely high attrition. However, it did add to our understanding of potential difficulties in utilising implicit assessments with this population and offers some considerations on appropriate adjustments.

As discussed above there may be a potential overlap between cognitive fusion with self-referential thoughts and self-esteem. A measure of self-as-context may have been a more appropriate measure. Unfortunately, the Self-as-Context Scale (Zettle et al., 2018) was published whilst the present study was in progress.

Finally, as patients with persistent pain are commonly prescribed high doses of pain medication, some information could have been collected on the type of medication taken and the duration of treatment. Additionally, substantial pain severity and interference was implied due to the participants' referral to the Pain Management Programme and the

current thresholds for this. However, these could have been explicitly measured, as variations within the sample could have been important.

4.5 Suggestions for future research

As previously discussed, there is a gap in the literature on self-as-context and the effectiveness of self-as-context techniques. This is especially relevant in persistent pain, as one's sense of self seems to be impacted upon by the experience of persistent pain. The use of the Self-as-Context Scale would be advisable in studies considering aspects of the self in persistent pain.

The extremely high attrition in IRAP completion in this study poses the question of whether this implicit tool is appropriate and/ or feasible to use with this population, especially when we consider the co-existing cognitive difficulties, high levels of anxiety and stress, and the specific psychological characteristics of prevalent conditions such as fibromyalgia. If the IRAP is to be used in future studies in persistent pain, it is advised that certain considerations are made:

- Appropriate time scales for recruitment to be considered. Individuals with persistent pain experience deterioration in their symptoms and this was observed to impact on assessment attendance in this study.
- High attrition in completion of the IRAP is likely and, therefore, a large pool of potential participants will be essential in order to achieve the recommended sample size of 29-37 (Vahey et al., 2015).
- The criteria for the IRAP can be adapted to 70% accuracy and 4000ms speed to account for the slower processing speed observed in this population. However,

the criteria should not become any more lenient, as this would have an impact on the robustness of the conclusions.

- Participants may benefit from a practice session of the IRAP, which may alleviate some of the anxiety and stress related to the assessment, and the burden on participants' working memory. However, this will increase the demand on the participants, and will need to be carefully considered.
- The content of the IRAP can be separated into more than one IRAP tasks, like in the Remue et al. study (2014), where possible and in line with the study aims, to reduce the need for concept change.

4.6 Conclusions

The predictions of the ACT model have been confirmed in this sample of people with persistent pain; namely, that cognitive fusion with self-referential thoughts and psychological inflexibility are linked to psychological distress and low self-esteem.

Psychological inflexibility seems to be an important predictor of psychological distress in this sample.

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CHAPTER 3

PUBLIC DISSEMINATION DOCUMENT

**A LITERATURE REVIEW ON THE EFFECTIVENESS OF COGNITIVE
DEFUSION**

AND

**AN EMPIRICAL STUDY EXPLORING THE PROCESSES OF COGNITIVE
FUSION AND SELF-AS-CONTENT IN PEOPLE WITH PERSISTENT PAIN**

This chapter provides a brief and accessible summary of the literature review and empirical study carried out by Maria Parissi, as part of the Doctorate in Clinical Psychology at the University of Birmingham.

Literature review:

Does cognitive defusion work?

Background

Acceptance and Commitment Therapy (ACT) is a therapeutic model with a growing evidence base in improving outcomes and increasing psychological flexibility (Hayes, 2012; Levin et al., 2018). According to ACT, psychological flexibility is dependant on six processes, which constantly interact (Hayes, 2006). Cognitive defusion is one of these processes. People commonly become entangled in the content of their own thoughts. Cognitive defusion refers to the process of seeing thoughts for what they are, merely sounds, and detaching oneself from the content of these thoughts (Harris, 2009). The effectiveness of cognitive defusion has been compared to therapeutic techniques of other therapy models.

Aim

The aim of the present systematic review was to explore the available evidence on the effectiveness of cognitive defusion in improving outcomes, when compared to alternative therapy model components.

Method

Four electronic databases were searched for relevant published papers. 18 papers, which met the inclusion and exclusion criteria, were identified. These were subjected to a quality framework to allow the comparative evaluation of the papers' strengths and weaknesses.

Results

Cognitive defusion was compared to a wide range of different therapeutic techniques. It is of worth to note that cognitive defusion is a therapeutic approach that can be clinically applied through the use of a number of defusion techniques. Therefore, great variation in the techniques used within the studies was observed. Overall, defusion was found to be as effective as cognitive restructuring, thought suppression, imaginal exposure, guided imagery, and acceptance in improving each study's chosen outcomes. Cognitive defusion was found to be more effective than thought distraction. However, an important methodological limitation is the lack of a measure of defusion.

Conclusion

Cognitive defusion appears to be, at least as effective as other therapeutic approaches. However, methodological limitations within the studies reduce confidence in the conclusions that can be drawn.

Empirical study:

Cognitive fusion and self-as-content in people with persistent pain

Background

The aim of Acceptance and Commitment Therapy (ACT) is to increase one's psychological flexibility (Hayes, 2006). ACT considers the context and function of distressing thoughts and emotions to be critical in understanding one's psychological difficulties (Harris, 2009).

Separating the thought or emotion from the context in which it appears, and the impact it has would be nonsensical (Bennett & Oliver, 2019). The aim of ACT is to increase one's psychological flexibility by changing the function and the context of distressing thoughts or emotions, not by helping one get rid of these.

Cognitive fusion and the self-as-content are believed to be two of the pathological processes, within ACT, that lead to compromised psychological flexibility, which has an impact on one's wellbeing and sense of self (Foody et al., 2013). Persistent pain is a difficult to treat, long-term physical condition also believed to have a significant impact on one's wellbeing and sense of self (Harris et al., 2003; Moseley & Vlaeyen, 2015).

Aims

The main aim of this study was to provide evidence that cognitive fusion with thoughts about oneself is linked to psychological distress and has an impact on one's self-esteem in people with persistent pain. This study also attempted to pilot a version of the Implicit Relational Assessment Procedure (IRAP; Barnes-Holmes et al., 2006), which is an implicit measure of

fusion with the self-as-content, and aims to bypass common limitations of self-report measures (Scott et al., 2016).

Method

29 patients with persistent pain completed a battery of self-report measures; a measure of cognitive fusion (Cognitive Fusion Questionnaire), a measure of self-esteem (Rosenberg Self-Esteem Scale), a measure of psychological inflexibility (Acceptance and Action Questionnaire-II), a measure of psychological distress (Depression, Anxiety, and Stress Scales-21), and a measure of social desirability (Marlowe-Crowne Social Desirability Scale). The participants also completed a version of the IRAP measuring the actual versus the ideal self. Pearson's r correlations were calculated to explore associations amongst the variables, and hierarchical regression was used to explore whether cognitive fusion, psychological inflexibility and/or self-esteem could predict psychological distress in people with persistent pain.

Findings

- High cognitive fusion was significantly associated with high psychological distress.
- High cognitive fusion was significantly associated with low self-esteem.
- Low self-esteem was associated with high psychological distress.
- High psychological inflexibility was associated with high psychological distress.
- Fusion and psychological inflexibility explained 41% of the variance of psychological

distress.

- Psychological inflexibility was found to be a significant predictor of psychological distress.
- A very small number of people met the criteria for the IRAP.

Conclusions

The findings support the primary hypotheses of the study and the theoretical predictions of ACT. Indeed, fusion with the content of thoughts about oneself was linked to high psychological distress, psychological inflexibility and low self-esteem in this sample of people with persistent pain. No conclusions can be drawn from the use of the IRAP due to the very small number of people who met the criteria.

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APPENDICES FOR VOLUME I

APPENDICES FOR CHAPTER 1

Appendix 1. Quality Framework Checklist (Downs & Black, 1998)

Appendix

Checklist for measuring study quality

Reporting

1. *Is the hypothesis/aim/objective of the study clearly described?*

yes	1
no	0

2. *Are the main outcomes to be measured clearly described in the Introduction or Methods section?*

If the main outcomes are first mentioned in the Results section, the question should be answered no.

yes	1
no	0

3. *Are the characteristics of the patients included in the study clearly described?*

In cohort studies and trials, inclusion and/or exclusion criteria should be given. In case-control studies, a case-definition and the source for controls should be given.

yes	1
no	0

4. *Are the interventions of interest clearly described?*

Treatments and placebo (where relevant) that are to be compared should be clearly described.

yes	1
no	0

5. *Are the distributions of principal confounders in each group of subjects to be compared clearly described?*

A list of principal confounders is provided.

yes	2
partially	1
no	0

6. *Are the main findings of the study clearly described?*

Simple outcome data (including denominators and numerators) should be reported for all major findings so that the reader can check the major analyses and conclusions. (This question does not cover statistical tests which are considered below).

yes	1
no	0

7. *Does the study provide estimates of the random variability in the data for the main outcomes?*

In non normally distributed data the inter-quartile range of results should be reported. In normally distributed data the standard error, standard deviation or confidence intervals should be reported. If the distribution of the data is not described, it must be assumed that the estimates used were appropriate and the question should be answered yes.

yes	1
no	0

8. *Have all important adverse events that may be a consequence of the intervention been reported?*

This should be answered yes if the study demonstrates that there was a comprehensive attempt to measure adverse events. (A list of possible adverse events is provided).

yes	1
no	0

9. *Have the characteristics of patients lost to follow-up been described?*

This should be answered yes where there were no losses to follow-up or where losses to follow-up were so small that findings would be unaffected by their inclusion. This should be answered no where a study does not report the number of patients lost to follow-up.

yes	1
no	0

10. *Have actual probability values been reported (e.g. 0.035 rather than <0.05) for the main outcomes except where the probability value is less than 0.001?*

yes	1
no	0

External validity

All the following criteria attempt to address the representativeness of the findings of the study and whether they may be generalised to the population from which the study subjects were derived.

11. *Were the subjects asked to participate in the study representative of the entire population from which they were recruited?*

The study must identify the source population for patients and describe how the patients were selected. Patients would be representative if they comprised the entire source population, an unselected sample of consecutive patients, or a random sample. Random sampling is only feasible where a list of all members of the relevant

population exists. Where a study does not report the proportion of the source population from which the patients are derived, the question should be answered as unable to determine.

yes	1
no	0
unable to determine	0

12. Were those subjects who were prepared to participate representative of the entire population from which they were recruited?

The proportion of those asked who agreed should be stated. Validation that the sample was representative would include demonstrating that the distribution of the main confounding factors was the same in the study sample and the source population.

yes	1
no	0
unable to determine	0

13. Were the staff, places, and facilities where the patients were treated, representative of the treatment the majority of patients receive?

For the question to be answered yes the study should demonstrate that the intervention was representative of that in use in the source population. The question should be answered no if, for example, the intervention was undertaken in a specialist centre unrepresentative of the hospitals most of the source population would attend.

yes	1
no	0
unable to determine	0

Internal validity - bias

14. Was an attempt made to blind study subjects to the intervention they have received?

For studies where the patients would have no way of knowing which intervention they received, this should be answered yes.

yes	1
no	0
unable to determine	0

15. Was an attempt made to blind those measuring the main outcomes of the intervention?

yes	1
no	0
unable to determine	0

16. If any of the results of the study were based on "data dredging", was this made clear?

Any analyses that had not been planned at the outset of the study should be clearly indicated. If no retrospective unplanned subgroup analyses were reported, then answer yes.

yes	1
no	0
unable to determine	0

17. In trials and cohort studies, do the analyses adjust for different lengths of follow-up of patients, or in case-control studies, is the time period between the intervention and outcome the same for cases and controls?

Where follow-up was the same for all study patients the answer should be yes. If different lengths of follow-up were adjusted for by, for example, survival analysis the answer should be yes. Studies where differences in follow-up are ignored should be answered no.

yes	1
no	0
unable to determine	0

18. Were the statistical tests used to assess the main outcomes appropriate?

The statistical techniques used must be appropriate to the data. For example non-parametric methods should be used for small sample sizes. Where little statistical analysis has been undertaken but where there is no evidence of bias, the question should be answered yes. If the distribution of the data (normal or not) is not described it must be assumed that the estimates used were appropriate and the question should be answered yes.

yes	1
no	0
unable to determine	0

19. Was compliance with the intervention/s reliable?

Where there was non compliance with the allocated treatment or where there was contamination of one group, the question should be answered no. For studies where the effect of any misclassification was likely to bias any association to the null, the question should be answered yes.

yes	1
no	0
unable to determine	0

20. Were the main outcome measures used accurate (valid and reliable)?

For studies where the outcome measures are clearly described, the question should be answered yes. For studies which refer to other work or that demonstrates the outcome measures are accurate, the question should be answered as yes.

yes	1
no	0
unable to determine	0

Internal validity - confounding (selection bias)

21. Were the patients in different intervention groups (trials and cohort studies) or were the cases and controls (case-control studies) recruited from the same population?

For example, patients for all comparison groups should be selected from the same hospital. The question should be answered unable to determine for cohort and case-control studies where there is no information concerning the source of patients included in the study.

yes	1
no	0
unable to determine	0

22. Were study subjects in different intervention groups (trials and cohort studies) or were the cases and controls (case-control studies) recruited over the same period of time?

For a study which does not specify the time period over which patients were recruited, the question should be answered as unable to determine.

yes	1
no	0
unable to determine	0

23. Were study subjects randomised to intervention groups?

Studies which state that subjects were randomised should be answered yes except where method of randomisation would not ensure random allocation. For example alternate allocation would score no because it is predictable.

yes	1
no	0
unable to determine	0

24. Was the randomised intervention assignment concealed from both patients and health care staff until recruitment was complete and irrevocable?

All non-randomised studies should be answered no. If assignment was concealed from patients but not from staff, it should be answered no.

yes	1
no	0
unable to determine	0

25. Was there adequate adjustment for confounding in the analyses from which the main findings were drawn?

This question should be answered no for trials if: the main conclusions of the study were based on analyses of treatment rather than intention to treat; the distribution of known confounders in the different treatment groups was not described; or the distribution of known confounders differed between the treatment groups but was not taken into account in the analyses. In non-randomised studies if the effect of the main confounders was not investigated or confounding was demonstrated but no adjustment was made in the final analyses the question should be answered as no.

yes	1
no	0
unable to determine	0

26. Were losses of patients to follow-up taken into account?

If the numbers of patients lost to follow-up are not reported, the question should be answered as unable to determine. If the proportion lost to follow-up was too small to affect the main findings, the question should be answered yes.

yes	1
no	0
unable to determine	0

Power

27. Did the study have sufficient power to detect a clinically important effect where the probability value for a difference being due to chance is less than 5%?

Sample sizes have been calculated to detect a difference of x% and y%.

	Size of smallest intervention group	
A	<n ₁	0
B	n ₁ - n ₂	1
C	n ₂ - n ₃	2
D	n ₃ - n ₄	3
E	n ₄ - n ₅	4
F	n ₅ +	5

APPENDICES FOR CHAPTER 2

Appendix 2. Letter of approval from the Health Research Authority



Miss Maria Parissi
Trainee Clinical Psychologist
Birmingham and Solihull Mental Health Foundation Trust
University of Birmingham
Edgbaston
B15 2TT

Email: hra.approval@nhs.net

16 August 2017

Dear Miss Parissi,

Letter of HRA Approval

Study title:	Cognitive defusion and the Self-as-Context in service users with chronic pain
IRAS project ID:	218882
Protocol number:	RG_16-203
REC reference:	17/WS/0078
Sponsor	Research and Enterprise, University of Birmingham

I am pleased to confirm that HRA Approval has been given for the above referenced study, on the basis described in the application form, protocol, supporting documentation and any clarifications noted in this letter.

Participation of NHS Organisations in England

The sponsor should now provide a copy of this letter to all participating NHS organisations in England.

Appendix B provides important information for sponsors and participating NHS organisations in England for arranging and confirming capacity and capability. Please read *Appendix B* carefully, in particular the following sections:


- *Participating NHS organisations in England* – this clarifies the types of participating organisations in the study and whether or not all organisations will be undertaking the same activities
- *Confirmation of capacity and capability* - this confirms whether or not each type of participating NHS organisation in England is expected to give formal confirmation of capacity and capability. Where formal confirmation is not expected, the section also provides details on the time limit given to participating organisations to opt out of the study, or request additional time, before their participation is assumed.
- *Allocation of responsibilities and rights are agreed and documented (4.1 of HRA assessment criteria)* - this provides detail on the form of agreement to be used in the study to confirm capacity and capability, where applicable.

Further information on funding, HR processes, and compliance with HRA criteria and standards is also provided.

Appendix 3. Letter of approval the Research & Innovation department of the participating trust

R&D Governance Office University Hospitals Birmingham 
NHS Foundation Trust

(RPAv42)


Dr Anne Marie Walker
Clinical Psychologist in Physical Health Pain
Management Team & Inherited Disorders Team
Queen Elizabeth Hospital Birmingham
Mindelsohn Way
Edgbaston
Birmingham B15 2WB

UHB Research Governance Office
1st Floor, Institute of Translational
Medicine
Heritage Building
Queen Elizabeth Hospital Birmingham
Mindelsohn Way
Edgbaston
Birmingham B15 2TH
Tel. 0121 371 4185

Research Project Authorisation

Project reference:RRK 6036

Main Ethics Committee Reference
IRAS Project ID 17/WS/0078
218882

6 February 2018

Dear Dr Walker

Cognitive defusion and the Self-as-Context in service users with chronic pain

Thank you for submitting details of your proposed research project, which I am happy to authorise on behalf of University Hospitals Birmingham; this includes confirmation of Capacity and Capability under the HRA Approval process.

The following main document versions were reviewed (note this is not a complete list of all documents submitted):

Protocol - version: V2.0 24/02/17
Participant information sheet (main) - version: V3.0 29/06/17
Participant consent form (main) - version: V3.0 29/06/17

Acv1/18

Sponsorship

University of Birmingham has agreed to act as sponsor for this study.

Indemnity arrangements.

Researchers who hold substantive or honorary contracts with University Hospital Birmingham (UHBT) will be covered against claims of negligence by patients of UHBT under the Clinical Negligence Scheme for Trusts (CNST). This scheme does not cover 'no fault' compensation and the Trust is precluded from taking out separate insurance to cover this. Any patient or volunteer taking part in the study is entitled to know that if they suffered injury as a result of participating in the study they would first have to prove negligence in a court of law before they could gain compensation.

If the study involves patients of any other Trust or healthcare organisation, you will need to confirm the indemnity arrangements with that organisation.

R&D Office

Head of R&D Governance: Dr Christopher Counsell

Head of R&D Operations: Joanne Plumb

R&D Office, 1st Floor, ITM, Heritage Building, Queen Elizabeth Hospital Birmingham, Edgbaston
Birmingham B15 2WG

Tel: 0121 371 4185 Fax:0121 371 4204 Email: R&D@uhb.nhs.uk

Website: www.research.uhb.nhs.uk

Projects database: //uhb/userdata/R & D/R&D database/distributed database 2002.mdb

Appendix 4. Participant Information Sheet

PARTICIPANT INFORMATION SHEET

UNIVERSITY OF
BIRMINGHAM

Study number: IRAS: 218882 RG_16-203

Title of Study: Cognitive fusion and the Self-as-Context in service users with Persistent Pain.

Researchers: Maria Parissi, Dr Richard Bennett

We would like to invite you to take part in our study. Below you will find some information about the purpose of the study and what would be involved in taking part. Please read carefully and if you have any questions or concerns, do not hesitate to contact us.

- **What is the purpose of this study?**

This study is being conducted by Maria Parissi, as part of her clinical psychology doctorate degree at the University of Birmingham.

This study will look at two different ways in which people relate to their thoughts and how these may be linked to psychological distress and self-esteem. This is in the context of a therapy model called Acceptance and Commitment Therapy, in short ACT. ACT has been used over the recent years to help people with persistent pain experiencing distress. We hope that this study will help support the use of specific techniques and interventions in therapy.

- **Why have I been invited to take part?**

You have been invited to take part because you receive or have received a psychological-based intervention for the management of pain.

- **What will happen if I agree to take part?**

You will arrange a convenient appointment for you to come into the service for the assessment. During the assessment, you will be asked to complete pen-and-paper

questionnaires and a task on the computer. You do not need to be familiar with computers to be able to do this task. Your participation will last approximately one hour.

All your answers will be anonymised, and they will be analysed together with the answers of other participants, not individually.

- **What will happen if I do not want to carry on with the study?**

You do not have to take part in the study and your decision will have no impact on your current or future treatment. You can also decide to withdraw during or after your participation without having to explain why. However, please be aware that the latest date that you will be able to withdraw your answers from our study will be December 2017.

- **Expenses and payments**

There will be a reimbursement of £5 as a thank you for taking out the time to take part in the study.

- **What will happen to the results of the research study?**

This study and its findings will form part of Maria Parissi's Clinical Psychology Doctorate thesis. The findings may be published in scientific journals. If you wish, we will send you a summary of the findings by post, once the study is completed.

- **What happens if I have any further concerns?**

If you have any further concerns before or after your participation, you can discuss these with a member of your team or Maria Parissi. Alternatively, you may wish to discuss any concerns with the PALS service.

Maria Parissi Email: mxp371@student.bham.ac.uk

PALS Service

Email: PALS@uhb.nhs.uk

Phone: 0121 3713280

Appendix 5. Participant Consent Form

CONSENT FORM

UNIVERSITY OF
BIRMINGHAM

Research site: Queen Elizabeth Hospital

Study Number: IRAS: 218882 RG_16-203

Study Title: Cognitive fusion and the Self-as-Context in service users with persistent pain.

Participant Identification Number:.....

CONSENT FORM

Title of Study: Cognitive fusion and the Self-as-Context in service users with persistent pain.

Researcher: Maria Parissi

Please initial box

1. I confirm that I have understood the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.
2. I understand that my participation is voluntary and that I am free to withdraw at any time during the research assessment, without giving any reason, without my own or my loved one's medical/social care or legal rights being affected.
3. I understand that I will have the right to withdraw the data from my assessment up until the data analysis stage in December 2017, without giving any reason, without my own or my loved one's medical/social care or legal rights being affected.
4. I understand that the data collected during this study will be looked at by the researcher and relevant others at the University of Birmingham to ensure that the analysis is a fair and reasonable representation of the data.
5. Parts of the data may be made available to the NHS team responsible for me or my family member's care only if any previously undisclosed issues of risk to me or my family member's safety should be disclosed. I will be made aware before any such disclosure occurs.
6. I agree to take part in the above study.

.....
Name of participant

.....
Date

.....
Signature

.....
Name of researcher

.....
Date

.....
Signature

Appendix 6. Self-report Questionnaires

Rosenberg Self-Esteem Scale (Rosenberg, 1965)

Instructions: Below is a list of statements dealing with your general feelings about yourself. If you strongly agree, circle SA. If you agree with the statement, circle A. If you disagree, circle D. If you strongly disagree, circle SD.

1.	On the whole, I am satisfied with myself.	SA	A	D	SD
2.*	At times, I think I am no good at all.	SA	A	D	SD
3.	I feel that I have a number of good qualities.	SA	A	D	SD
4.	I am able to do things as well as most other people.	SA	A	D	SD
5.*	I feel I do not have much to be proud of.	SA	A	D	SD
6.*	I certainly feel useless at times.	SA	A	D	SD
7.	I feel that I'm a person of worth, at least on an equal plane with others.	SA	A	D	SD
8.*	I wish I could have more respect for myself.	SA	A	D	SD
9.*	All in all, I am inclined to feel that I am a failure.	SA	A	D	SD
10.	I take a positive attitude toward myself.	SA	A	D	SD

Scoring: SA=3, A=2, D=1, SD=0. Items with an asterisk are reverse scored, that is, SA=0, A=1, D=2, SD=3. Sum the scores for the 10 items. The higher the score, the higher the self esteem.

The scale may be used without explicit permission. The author's family, however, would like to be kept informed of its use:

The Morris Rosenberg Foundation c/o Department of Sociology University of Maryland SEP 2112 Art/Soc Building

DASS₂₁

Name:

Date:

Please read each statement and circle a number 0, 1, 2 or 3 which indicates how much the statement applied to you *over the past week*. There are no right or wrong answers. Do not spend too much time on any statement.

The rating scale is as follows:

- 0 Did not apply to me at all
- 1 Applied to me to some degree, or some of the time
- 2 Applied to me to a considerable degree, or a good part of time
- 3 Applied to me very much, or most of the time

1	I found it hard to wind down	0	1	2	3
2	I was aware of dryness of my mouth	0	1	2	3
3	I couldn't seem to experience any positive feeling at all	0	1	2	3
4	I experienced breathing difficulty (eg, excessively rapid breathing, breathlessness in the absence of physical exertion)	0	1	2	3
5	I found it difficult to work up the initiative to do things	0	1	2	3
6	I tended to over-react to situations	0	1	2	3
7	I experienced trembling (eg, in the hands)	0	1	2	3
8	I felt that I was using a lot of nervous energy	0	1	2	3
9	I was worried about situations in which I might panic and make a fool of myself	0	1	2	3
10	I felt that I had nothing to look forward to	0	1	2	3
11	I found myself getting agitated	0	1	2	3
12	I found it difficult to relax	0	1	2	3
13	I felt down-hearted and blue	0	1	2	3
14	I was intolerant of anything that kept me from getting on with what I was doing	0	1	2	3
15	I felt I was close to panic	0	1	2	3
16	I was unable to become enthusiastic about anything	0	1	2	3
17	I felt I wasn't worth much as a person	0	1	2	3
18	I felt that I was rather touchy	0	1	2	3
19	I was aware of the action of my heart in the absence of physical exertion (eg, sense of heart rate increase, heart missing a beat)	0	1	2	3
20	I felt scared without any good reason	0	1	2	3
21	I felt that life was meaningless	0	1	2	3

CFQ

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. I over-analyse situations to the point where it's unhelpful to me	1	2	3	4	5	6	7
4. I struggle with my thoughts	1	2	3	4	5	6	7
5. I get upset with myself for having certain thoughts	1	2	3	4	5	6	7
6. I tend to get very entangled in my thoughts	1	2	3	4	5	6	7
7. 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

Thank you for completing this questionnaire

AAQ-II

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

This is a one-factor measure of psychological inflexibility, or experiential avoidance. Score the scale by summing the seven items. Higher scores equal greater levels of psychological inflexibility.

Bond, F. W., Hayes, S. C., Baer, R. A., Carpenter, K. M., Guenole, N., Orcutt, H. K., Waltz, T., & Zettle, R. D. (in press). Preliminary psychometric properties of the Acceptance and Action Questionnaire – II: A revised measure of psychological inflexibility and experiential avoidance. *Behavior Therapy*.

Self Assessment

Dare You Say What You Think? The Social-Desirability Scale

Do you say what you think, or do you tend to misrepresent your beliefs to earn the approval of others? Do you answer questions honestly, or do you say what you think other people want to hear?

Telling others what we think they want to hear is making the socially desirable response. Falling prey to social desirability may cause us to distort our beliefs and experiences in interviews or on psychological tests. The bias toward responding in socially desirable directions is also a source of error in the case study, survey, and testing methods. You can complete the Social-Desirability Scale devised by Crowne and Marlowe to gain insight into whether you have a tendency to produce socially desirable responses.

Directions: Read each item and decide whether it is true (T) or false (F) for you. Try to work rapidly and answer each question by clicking on the T or the F. Then click on Total Score to access the Scoring Key and interpret your answers.

1. T F Before voting I thoroughly investigate the qualifications of all the candidates.
2. T F I never hesitate to go out of my way to help someone in trouble.
3. T F It is sometimes hard for me to go on with my work if I am not encouraged.
4. T F I have never intensely disliked anyone.
5. T F On occasions I have had doubts about my ability to succeed in life.
6. T F I sometimes feel resentful when I don't get my way.
7. T F I am always careful about my manner of dress.
8. T F My table manners at home are as good as when I eat out in a restaurant.
9. T F If I could get into a movie without paying and be sure I was not seen, I would probably do it.
10. T F On a few occasions, I have given up something because I thought too little of my ability.
11. T F I like to gossip at times.
12. T F There have been times when I felt like rebelling against people in authority even though I knew they were right.
13. T F No matter who I'm talking to, I'm always a good listener.
14. T F I can remember "playing sick" to get out of something.
15. T F There have been occasions when I have taken advantage of someone.
16. T F I'm always willing to admit it when I make a mistake.
17. T F I always try to practice what I preach.
18. T F I don't find it particularly difficult to get along with loudmouthed, obnoxious people.
19. T F I sometimes try to get even rather than forgive and forget.
20. T F When I don't know something I don't mind at all admitting it.
21. T F I am always courteous, even to people who are disagreeable.
22. T F At times I have really insisted on having things my own way.
23. T F There have been occasions when I felt like smashing things.
24. T F I would never think of letting someone else be punished for my wrong-doings.
25. T F I never resent being asked to return a favor.
26. T F I have never been irked when people expressed ideas very different from my own.
27. T F I never make a long trip without checking the safety of my car.
28. T F There have been times when I was quite jealous of the good fortune of others.
29. T F I have almost never felt the urge to tell someone off.
30. T F I am sometimes irritated by people who ask favors of me.
31. T F I have never felt that I was punished without cause.
32. T F I sometimes think when people have a misfortune they only got what they deserved.
33. T F I have never deliberately said something that hurt someone's feelings.

SOURCE: D. P. Crowne and D. A. Marlowe, A new scale of social desirability independent of pathology, *Journal of Consulting Psychology* 24 (1960): 351. Copyright 1960 by the American Psychological Association. Reprinted by permission.

Reset

Total Score

Appendix 7. IRAP instructions

The second part of the test is the computer task. First of all, it's just about familiarising yourself with the task. If you could start by hovering your fingers over the "D" and "K" keys, these are the two main keys you will be using. If you press "D" this means that you are responding "Yes" and if you press the "K" key this means you are responding "No".

Statements are going to appear on the screen which you will have to respond Yes or No to. You will not be responding in terms of how you feel about yourself but in relation to how the computer task wants you to respond. You can treat it a bit like a game, in trying to work out what the correct responses are and to try and get as many correct as you can. Take your time to work out the correct responses, this might not make sense initially, but it might start to make sense over time. Your goal is to avoid the red X's.

To do this you need to take your time initially – if you take your time at the start of the practice phase the tasks become easy quickly (even if a little weird), but if you rush yourself it is more difficult to give the correct responses – **so give yourself a chance and take it slowly, especially at the start.**

During the experiment you will be asked to respond as **accurately** as you can across all trials. When you make an incorrect response for a task it is signaled by the appearance of a red 'X' in the centre of the screen. This will signal to you that you need to change your answer. If you see lots of red crosses appear, this may be a cue to slow down. Don't worry if you make mistakes, just notice when you get the red cross and change the way you respond to this.

(Pointing to each of the four sample trials below to check that they understand how to respond. Also, if you were going to have the response options altering position during the task you would let people know that as you show them the sample trials.).

When they reach the accuracy screen I have a look at their scores with them.

If they have reached an accuracy of >70% and latency of <3secs:

Great, so this task wants you to get an accuracy of 70% or above and to respond within 3000ms so your responding is perfect. Well done!

During this next block, you will notice that the answers switch. Try to figure out how the computer wants you to respond now.

(Pointing to each of the four sample trials below to check that they understand how to respond. Also, if you were going to have the response options altering position during the task you would let people know that as you show them the sample trials.).

When they reach the accuracy screen I have a look at their scores with them.

If they have reached an accuracy of >70% and latency of <3secs:

Great, so this task wants you to get an accuracy of 70% or above and to respond within 3000ms so your responding is perfect. Well done!

If they get good latency but poor accuracy:

Ok so your responding time is great because this task wants you to respond within 3000ms but it wants you to get an accuracy of 70% or above. So you can slow down as you have plenty of time there to play around with to get your accuracy up. Don't worry that's what the practice is for, to give you the time to get used to this.

If they get good accuracy but poor latency:

Ok so your accuracy is great because this task wants you to get an accuracy of 70% or above but it wants you to respond within 3000ms, so you just need to speed up a little. Don't worry that's what the practice is for, to give you the time to get used to this and as you become familiar you'll get quicker.

Illustrations

Shown below are illustrations of the four different types of statement that will be presented repeatedly in this part of the experiment.

Illustration 1

I am

Strong

Select 'd' for
Yes

Select 'k' for
No

Illustration 2

I want to be

Useful

Select 'd' for
Yes

Select 'k' for
No

Illustration 3

I am

Bad

Select 'd' for
Yes

Select 'k' for
No

Illustration 4

I want to be

Weak

Select 'd' for
Yes

Select 'k' for
No
