UNIVERSITY OF SOUTHAMPTON

FACULTY OF SOCIAL AND HUMAN SCIENCES

School of Psychology

Volume 1 of 1

The role of imagery and the self in the eating disorders

by

Kate Louise Bramwell

Thesis for the degree of Doctor in Clinical Psychology

May 2018

Word Count: 18,698

UNIVERSITY OF SOUTHAMPTON

ABSTRACT

FACULTY OF SOCIAL AND HUMAN SCIENCES

School of Psychology

Thesis for the degree of Doctor in Clinical Psychology

THE ROLE OF IMAGERY AND THE SELF IN THE EATING DISORDERS

Kate Louise Bramwell

The first part of this thesis is a systematic review evaluating the role of spontaneous imagery and the use of imagery techniques in people with eating disorders and sub-clinical populations. 14 studies were selected for review and their methodological quality was assessed. The findings suggest spontaneous images of items such as the self, food and social interactions are present more often in people with eating disorders than those without and could be a potential maintaining factor in the disorders. The findings suggest imagery techniques including guided imagery, positive self-imagery and imagery rescripting can effect change in several key aspects of the eating disorders. However, this body of research is in its infancy and the quality of the studies included means the results must be interpreted with caution.

Eating disorders are characterised by a negative sense of self and current eating disorder treatments typically use verbal based techniques such as cognitive restructuring to target these views of the self. Imagery has shown promise in targeting aspects of the self, however no studies have compared whether one approach is more effective than the other. The empirical part of this thesis compared a positive self-imagery intervention with a cognitive restructuring intervention on aspects of the self (self-concept clarity, self-discrepancies, self-esteem), affect and eating pathology in a sub-clinical eating disorder population. Both interventions reduced negative state self-esteem, eating pathology and bingeing behaviour and had no effect on self-concept clarity or self-discrepancies. Only the imagery intervention improved positive state self-esteem and positive affect and reduced negative affect and restricting behaviour. The imagery intervention was more effective compared to the control group than the verbal intervention, however, there were no significant differences between the effectiveness of the interventions when compared with each other. Clinical implications, limitations and future research directions are discussed.

Table of Contents

List of Tables

List of Figures

Academic Thesis: Declaration Of Authorship

I, Kate Bramwell, declare that this thesis and the work presented in it are my own and has been generated by me as the result of my own original research.

The role of imagery and the self in the eating disorders

I confirm that:

1. This work was done wholly or mainly while in candidature for a research degree at this University;
2. Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated;
3. Where I have consulted the published work of others, this is always clearly attributed;
4. Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work;
5. I have acknowledged all main sources of help;
6. Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself;
7. None of this work has been published before submission

Signed: .....

Date: .....

Acknowledgements

This thesis would not have been possible without the help of various people. Firstly I would like to thank all of the participants that took part and willingly gave up their time to complete the questionnaires and intervention tasks.

Secondly I would like to thank my two supervisors, Professor Lusia Stopa and Dr. Hannah Turner for their invaluable advice, expertise and support throughout the whole process.

I would also like to thank my family, friends and other members of my cohort for their constant support, listening ears and encouragement. I would particularly like to thank Isabel Lewis for her collaboration in the recruitment process.

And finally, a special thank you to my partner Matt for his unwavering support and belief in me, throughout the whole journey of the doctorate.

Chapter 1 The role of imagery in the eating disorders: A systematic review of the literature

1.1 Introduction

Imagery is one of the 'hot topics in modern cognitive behaviour therapy' (Holmes, Arntz & Smucker, 2007, p.298) and research on imagery in psychological disorders has increased in recent years. Research has found that mental imagery can play a maintaining role in various psychological disorders (Hackmann, Clark & McManus, 2000) and that imagery techniques can be effective in their treatment (e.g Wild & Clark, 2011; Wild, Hackmann & Clark, 2007).

Despite the general increase in literature examining imagery, research on mental imagery in the eating disorders remains scarce. However, there is a growing body of literature examining the potential maintaining effects of mental images in the eating disorders, and examining how effective imagery techniques are in treating aspects of the eating disorders. This review aims to explore this emerging research area. First the key terms will be defined before providing an overview of the proposed role imagery plays in psychopathology and consider current eating disorder models and treatments. Second, it will review the empirical evidence regarding the role of spontaneous imagery in eating disorders and the effectiveness of imagery techniques in tackling key aspects of the eating disorders.

1.1.1 Definitions

Imagery

Imagery has been defined as "a mental representation that occurs without the need for external sensory input" (Stopa, 2009, p.1) and a mental image is "an internal representation in one's head or mind, as opposed to a drawing, or a picture captured on paper or canvas" (Cooper, 2009, p.184). Images can occur spontaneously or be retrieved deliberately and can range from sudden memories of past events to daydreams about possible future events (Holmes & Matthews, 2010). Images can occur in many forms as they can involve different representational systems involving all the senses such as visual,

hearing, smell, taste, touch and movement (Cooper, 2009); however, visual imagery is the most common form in which mental images are experienced (Holmes et al., 2007).

Eating disorders

Eating disorders are mental health disorders that are commonly cited as one of the most difficult psychiatric illnesses to treat (Kaplan & Garfinkel, 1999; Warren, Crowley, Olivardia & Schoen, 2008). Annual incidence rates for all diagnosed eating disorders is reported to be 37.2% per 100,000 (Micali, Hagberg, Petersen & Treasure, 2013) with females affected more often than males. Different types of eating disorders occur in adults; however, most of the research concentrates on anorexia nervosa (AN), bulimia nervosa (BN) and binge eating disorder (BED).

AN is characterised by a restriction of energy intake relative to requirements leading to low body weight, an intense fear of gaining weight, a disturbance in how body weight or shape is experienced and undue influence of body weight or shape on self-evaluation (APA, 2013).

BN is characterised by recurrent episodes of binge eating, defined as: eating in a discrete period of time, an amount of food larger than what most people would eat in a similar period, and a sense of a lack of control over eating. BN also involves recurrent compensatory behaviour (e,g self-induced vomiting, laxative misuse, over-exercise) and self-evaluation unduly influenced by weight or shape (APA, 2013).

BED is characterised by recurrent episodes of binge eating (as defined above). The binge eating is associated with three or more of the following: eating more rapidly than normal, eating until uncomfortably full, eating alone, feeling disgusted with oneself and eating large amounts when not physically hungry. The bingeing is also associated with distress and is not associated with any compensatory behaviours (APA, 2013).

1.1.2 Imagery in psychopathology

As noted above, mental imagery has been recognised as playing an important role in psychopathology in recent years. Part of that role is hypothesised to be through its impact on emotions, its link with autobiographical memories and its relationship to the self. Autobiographical memories often take the form of images (Rubin, 2006) and neural studies have shown increased activation in emotion-related areas of the brain when an

autobiographical memory is recalled (Greenberg et al., 2005). The images recalled with, or as part of these memories can be of various different objects, situations or of the self.

Given the image-emotion link, self-representations that take the form of images can have strong emotional consequences due to the fundamental role that self-perception plays in one's mood and well-being (Stopa, 2009). To understand the relationship between autobiographical memories, the self and imagery, Conway and Pleydell-Pearce (2000) offer a useful framework. Conway and Pleydell-Pearce suggest that the memories in the autobiographical memory store contain information about life time periods (e.g school), general events (e.g learning to drive) and event-specific memories (e.g wedding day). This store of memories provides the knowledge base from which individuals form representations of the self. One important type of memory that shapes the self are 'self-defining memories' (Singer & Salovey, 1993), which are memories that encapsulate someone's life story (Beike, Kleinknecht & Wirth-Beaumont, 2004) and are associated with high levels of emotion. Self-defining memories and the images associated with them can be positive or negative; however in psychopathology, the negative memories and images are usually more problematic.

In many psychological disorders, images of the self that accompany or represent these autobiographical memories can be highly distorted and represent a person's worst fears about who they are or how others might see them (Stopa, 2009). For example, research suggests people with BN experience spontaneous negative self-images images linked to shame, humiliation or abandonment (Hinrichsen, Morrison, Waller & Schmidt, 2007; Somerville, Cooper & Hackmann, 2007) before vomiting (Hinrichsen et al., 2007) and when worrying about their eating, weight or shape (Somerville et al.) These findings suggest negative self-imagery could serve as a maintaining factor in BN, perhaps through the triggering of negative thoughts associated with the images, or the triggering of certain behaviours such as vomiting (Hinrichsen et al., 2007). However, current eating disorder models have not incorporated imagery into them thus far.

1.1.3 Psychological models of eating disorders

Various psychological models exist to aid our understanding of the development and maintenance of eating disorders and to guide their treatment. Some of the current National Institute for Health and Care Excellence (NICE, 2017) recommended eating disorder treatments are based upon the transdiagnostic cognitive behavioural model

(Fairburn, Cooper & Shafran, 2003) which suggests that the different types or categories of eating disorders all have similar characteristics and underlying psychopathology (Favaro, Ferrara & Santonastaso, 2003). Other cognitive models provide more detailed theoretical background about specific processes, such as the cognitive model of BN (Cooper, Wells and Todd, 2004) which highlights the role of core beliefs in the development and maintenance of BN. Beliefs about the self, such as core beliefs, are important to consider when exploring the potential role of imagery in eating disorders, given the aforementioned links between the self and imagery. These two models will be examined in more detail below.

Transdiagnostic cognitive behavioural model

The transdiagnostic model suggests that the over-evaluation of shape and weight, and their control is a central maintaining factor in all eating disorders. The over-evaluation is characterised by dysfunctional beliefs about self-worth which involve the overestimation of body weight, appearance and their control. These beliefs often involve cognitions about body dissatisfaction, which is one of the most consistent and robust risk factors for developing and maintaining an eating disorder (Stice, 2002). People with eating disorders base their sense of self-worth and self-esteem on their weight, figure and their ability to control them and engage in behaviours such as restricting, bingeing and purging to do so, which then reinforces these beliefs (Dudek, Ostaszewski & Malicki, 2014). This can either lead to low weight in AN, or to binge eating and compensatory strategies in BN.

The model also suggests that there are up to four maintaining processes that can be key features of eating disorders: mood intolerance (defined as an inability to cope with emotional states), core low self-esteem, perfectionism and interpersonal difficulties (represented as LIFE in the diagram). A diagram of this model can be seen in Figure 1.

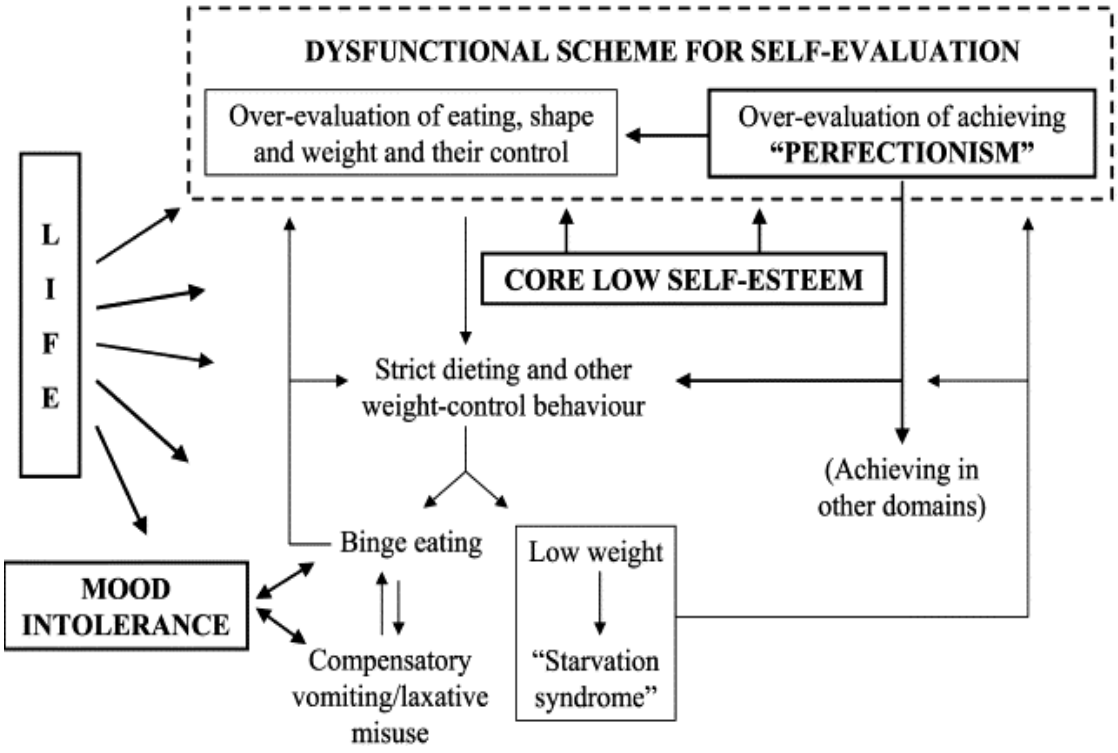


Figure 1. Transdiagnostic model of eating disorders (Fairburn, Cooper & Shafran, 2003)

The model proposes that core low self-esteem motivates individuals to try to achieve success in their valued domain of weight and shape control in order to increase their feelings of self-worth, which maintains the over-evaluation of weight and shape (Lampard, Tasca, Balfour & Bissada, 2013). Clinical perfectionism is proposed to maintain the over-evaluation of weight and shape by motivating individuals to engage perfectly in dietary restraint and other behaviours related to weight and shape. Interpersonal difficulties may also lead to increased efforts in dietary restraint in order to achieve the socially valued ideal (Lampard et al., 2013). Finally, mood intolerance may lead to binge eating and purging or other compensatory behaviours in order to cope with negative mood states.

Cognitive model of BN

This model suggests that negative self-beliefs play an important role in the development of BN. The model proposes that a traumatic or difficult childhood experience gives rise to negative self-beliefs and consequent compensatory strategies such as dieting in order to cope with the beliefs (Cooper et al., 2004).

In terms of the maintenance of BN, this model suggests an episode of bingeing is preceded by a trigger such as seeing oneself in the mirror or a negative comment about

one's weight which activates negative beliefs about the self. The negative self-beliefs lead to negative automatic thoughts and subsequent distress. The model proposes that the distress then triggers further negative thoughts about eating such as 'I'll put on weight' as well as positive thoughts about eating such as 'eating will make me feel better'. The conflict between these sets of thoughts is resolved by permissive thoughts about eating such as 'a bit more won't make much difference' after which, eating occurs. The eating is followed by negative thoughts about the self and negative emotions, which allow the cycle to continue (Cooper et al., 2004). Furthermore, eating distracts from the negative emotions experienced and purging or other compensatory behaviours occur when the negative beliefs about eating become stronger than the positive beliefs about eating (Cooper et al., 2004). The model can be seen in Figure 2.

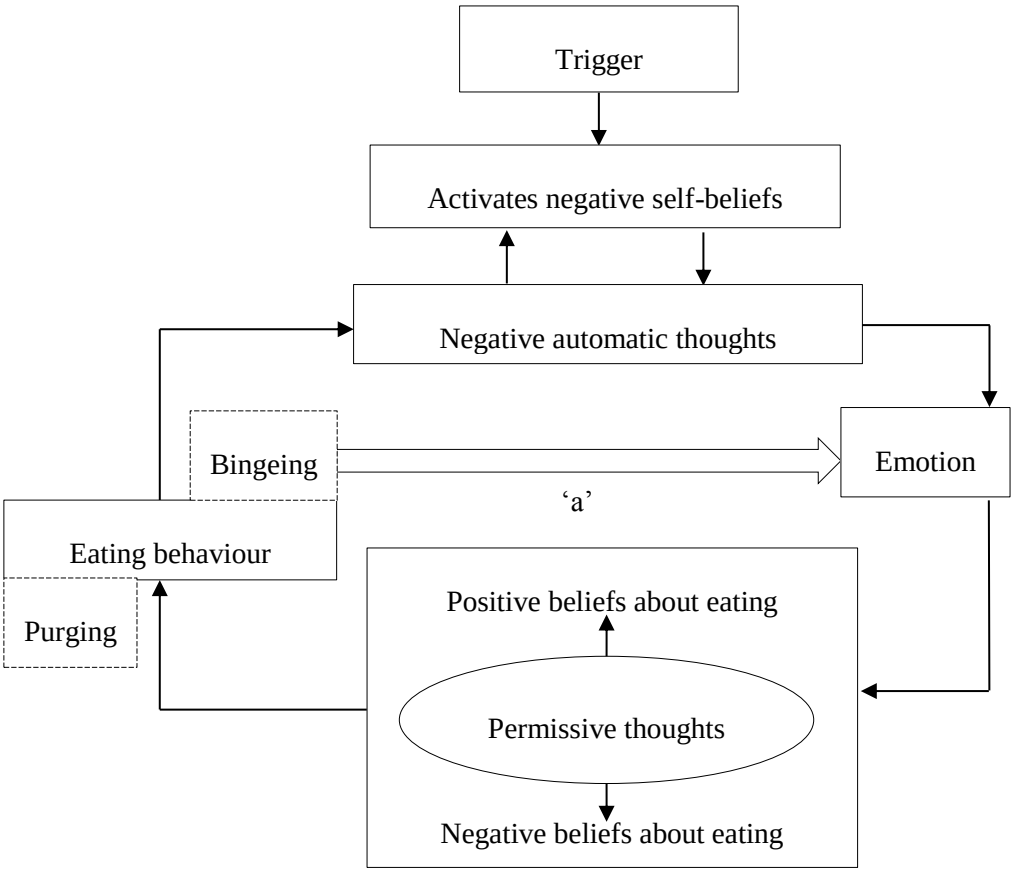


Figure 2. Cognitive model of bulimia nervosa 'a' = distracting effects of eating on emotional intensity and direct physiological effects on feeling states/interoception. (Cooper, Wells & Todd, 2004)

1.1.4 Critique of eating disorder models

Both aforementioned models position the self as having a role in the maintenance of eating disorders. The transdiagnostic model conceptualises the self in terms of self-esteem whereas the cognitive model of BN conceptualises the self in terms of self-beliefs. Given that eating disorders are characterised by a general negative sense of self (Cooper, 2009) it is promising that both models incorporate the self. However, the self is a complex construct of which negative self-beliefs and self-esteem are integral parts, however, in isolation, they do not capture the complexities of the self. This is an element of the model where imagery may play a potential role as self-representations in the form of self-images are an aspect of the self, shown to influence wellbeing and mood (Stopa, 2009).

Furthermore, the cognitive model of BN only attempts to explain the development and maintenance of BN, and subsequent models have shown similar cognitive processes in both BN and AN (Waller, Kennerley & Ohanian, 2007). Although the transdiagnostic model suggests that all of the additional maintaining mechanisms are applicable to all eating disorders, some of these have been shown to differ between diagnoses; for example, perfectionism has been associated with core eating pathology in AN and atypical eating disorders, but not BN. By comparison, low self-esteem and mood intolerance have been shown to be maintaining factors across AN, BN and atypical eating disorders (Lampard et al., 2013). This demonstrates that there are aspects of the models that are not fully understood and there are perhaps other factors, such as imagery, that could be playing a role that is not yet understood.

The importance of accurate conceptual models is highlighted by the limited effectiveness of current eating disorder treatments. The NICE guidelines (2017) recommend cognitive behaviour therapy for eating disorders (CBT-ED) as a treatment for all eating disorders and a recent systematic review concluded that CBT is efficacious for eating disorders compared to other available treatments (Linardon, Wade, De La Piedad Garcia & Brennan, 2017). However, a large percentage of patients fail to respond to CBT (Murphy, Straebler, Cooper & Fairburn, 2010); therefore exploring ways to develop the current models and clinical techniques is pivotal in improving clinical outcomes.

Given the limitations of current models and treatments, the promising research on imagery in other psychological disorders, and the early preliminary evidence suggesting negative self-images are present in people with BN, imagery offers an interesting avenue to explore how to further develop current eating disorder models and treatments.

Furthermore, Tatham (2011) reviewed the effectiveness of imagery techniques in CBT for the eating disorders, concluding there is potential for them to be used in treatment but further research is needed.

1.1.5 Review objectives

Thus far there has been no systematic comprehensive evaluation of the literature on imagery in the eating disorders as the only previous review (Tatham, 2011) focused mainly on imagery techniques. This systematic review therefore aimed to explore the role of mental imagery in the eating disorders by answering the following questions:

1) Prevalence/description: How prevalent is the occurrence of spontaneous/intrusive mental images in people with eating disorders and those most at risk? What are the characteristics of the images that occur? Is there a relationship between the images and key features of eating disorders?
2) Treatment/therapy: How effective is the use of imagery techniques in the assessment and treatment of key features of the eating disorders in people with eating disorders and those most at risk?

Given the small amount of literature available and the fact that eating disorders lie on a continuum with clinical eating disorders at one end and absence of any eating disorder behaviour at the other end (Peck & Lightsey, 2008), non-clinical populations of those at risk of developing an eating disorder were included. These are defined in this review as populations with high rates of body dissatisfaction or high rates of eating pathology. Key features of eating disorders in this review are defined as:

- the main symptoms of eating disorders: bingeing, purging, restricting, desire to eat
- the maintaining processes as characterised by the transdiagnostic model: self-esteem, perfectionism, mood intolerance and interpersonal difficulties
- negative core beliefs and negative thoughts as characterised by the cognitive model of BN
- body dissatisfaction/satisfaction

Identifying the nature of mental images relevant to the eating disorders will help to inform future research in exploring the potential maintaining effects of images. Identifying the interventions which are most effective will support researchers and clinicians in highlighting future avenues for research and the development of more effective treatment options.

1.2 Method

1.2.1 Search strategy

The following five electronic databases were searched from 1877 to 22nd December 2017: Psycinfo, Medline, Cumulative Index of Nursing Allied Health Literature (CINAHL) and Web of Science. Grey literature was also searched in terms of dissertations and theses using Proquest dissertations UK and Ireland. The search terms in Table 1 were used to identify relevant studies for review. The first set of terms 'Imagery' were included to ensure studies regarding mental images or imagery interventions were captured and the second and third sets of terms 'eating disorders' and 'at risk population' were included to ensure the target population was captured. Where terms had British and American spellings, the truncation symbol '?' was used to capture both spellings of the word. Each set of terms were entered into the databases separately and then combined using the Boolean operator 'OR'. All three sets of terms were then combined using the Boolean operator 'AND' to yield the final results.

Table 1. *Search terms entered into the databases*

	Imagery	*Eating disorders*	*At risk population*
Search terms	"imagery" OR "image* rescripting" OR "visuali?ation"OR "compassionate image*" OR "guided image*" OR "image* intervention*" OR "image* technique*" OR "image* strategy" OR "self-imagery" OR "positive image*" OR "negative image*" OR "intrusive image*" OR "mental image*"	"eating disorder*" OR "anorexia nervosa" OR "bulimia nervosa" OR "binge eating disorder" OR "Other Specified Feeding or Eating Disorder*" OR "Eating Disorder* Not Otherwise Specified" OR "atypical eating disorder*" OR "Unspecified Feeding OR Eating Disorder*"	"body dissatisfaction" OR "body satisfaction" OR "disordered eating"

Two reviewers (myself and another researcher) independently screened all titles and abstracts to ensure reliability and any differences were discussed. There was excellent inter-rater reliability (Cohen's kappa =.81; 96% agreement). Reference lists of selected full-text articles were also screened and retrieved as appropriate as various studies have

demonstrated the importance of checking reference lists to identify further studies to review (e.g Brettle & Long, 2001, Papaioannou, 2010).

1.2.2 Eligibility criteria

All papers were examined against pre-determined inclusion/exclusion criteria that were based upon scoping searches, as seen in Table 2.

Table 2. *Inclusion and exclusion criteria*

	Inclusion	*Exclusion*
Types of study and publication type	For (1): cross sectional studies, observational studies, longitudinal studies	For (1) and (2): theoretical papers, book chapters or book reviews, review papers, meta-analyses, qualitative studies
	For (2): RCT's, case studies, case series, quasi-experimental studies, before-after studies	For (1) and (2): papers not written in English
	For (1) and (2): non-published studies including dissertations and theses	
Participants	For (1) and (2) males and females of any age either with a clinical diagnosis of an eating disorder or in non-clinical populations, participants have been screened for presence of eating pathology or body dissatisfaction	For (1) and (2) participants not screened for presence of eating pathology or body dissatisfaction
Content of study	For (1) any studies looking at occurrence, frequency, relationship of mental images (images occurring without input from external stimuli)	For (1) and (2) studies exploring: medical imaging techniques/ outcomes of brain imaging studies, impact of viewing visual images, visual image paradigms or other external stimuli, development or validation of questionnaires or scales, cognitive/perceptual biases in representations of the self, hypnosis. Studies where imagery intervention effects not measured (if imagery is part of another intervention)
	For (2) intervention studies looking at use of any type of imagery techniques to affect change in key features of eating disorders	
Outcomes	For (2) only: at least one measure of dietary restraint, perfectionism, mood, self-esteem, binge eating, desire to eat, vomiting, laxative use, interpersonal difficulties or body dissatisfaction	For (2): no measure of any key eating disorder features

1.2.3 Data extraction

Data extraction included the following from each study: design and aim of study, sample characteristics (gender, age, eating pathology, sampling method), intervention or if not an intervention study, the exploratory methods used, key eating disorder features examined, measurement tools used to examine the features and the key findings (with calculated effect sizes where possible).

1.2.4 Quality assessment

The quality of all studies was assessed using the Quality Assessment Tool for Quantitative Studies (QATSQ; Effective Public Practice Health Project, 1998, Appendix A). This has six sections assessing selection bias, study design, confounders, blinding, data collection methods and withdrawals and drop-outs. Each section has a number of questions which yield a rating of strong, moderate or weak for that section based on an instruction manual to guide scoring of the questionnaire. The section ratings are used to yield an overall rating for each paper using the following criteria: no weak ratings – strong overall, one weak rating – moderate overall, two or more weak ratings – weak overall.

This was chosen as this review contains studies of various designs and the QATSQ can be used with a range of study designs. The QATSQ has good construct and content validity and test-retest reliability is ‘adequate’ (Thomas, Ciliska, Dobbins & Micucci, 2004). It also has ‘fair’ inter-rater agreement for individual domains and ‘excellent’ inter-rater agreement for the final rating (Armijo-Olivo, Stiles, Hagen, Biondo & Cummings, 2012).

1.3 Results

1.3.1 Search

The review process identified 1110 records and after duplicates were removed, 897 were screened. 771 of these were excluded based on screening of the title and abstract leaving 126 that were eligible for full text screening. One of these articles however could not be obtained due to external library restrictions, therefore 125 full text articles were screened for eligibility. 112 of these were excluded for the following reasons: not available in English, not correct population, not concerned with imagery interventions or image occurrence, no measure of eating disorder pathology, imagery intervention not specifically measured, imagery intervention not aiming to change eating disorder features, image occurrence activated by external stimuli, unpublished version of published paper already included, review or theoretical papers. One article was also identified from the reference lists. 14 articles were eligible for inclusion in the final review. The search process can be seen in Figure 3.

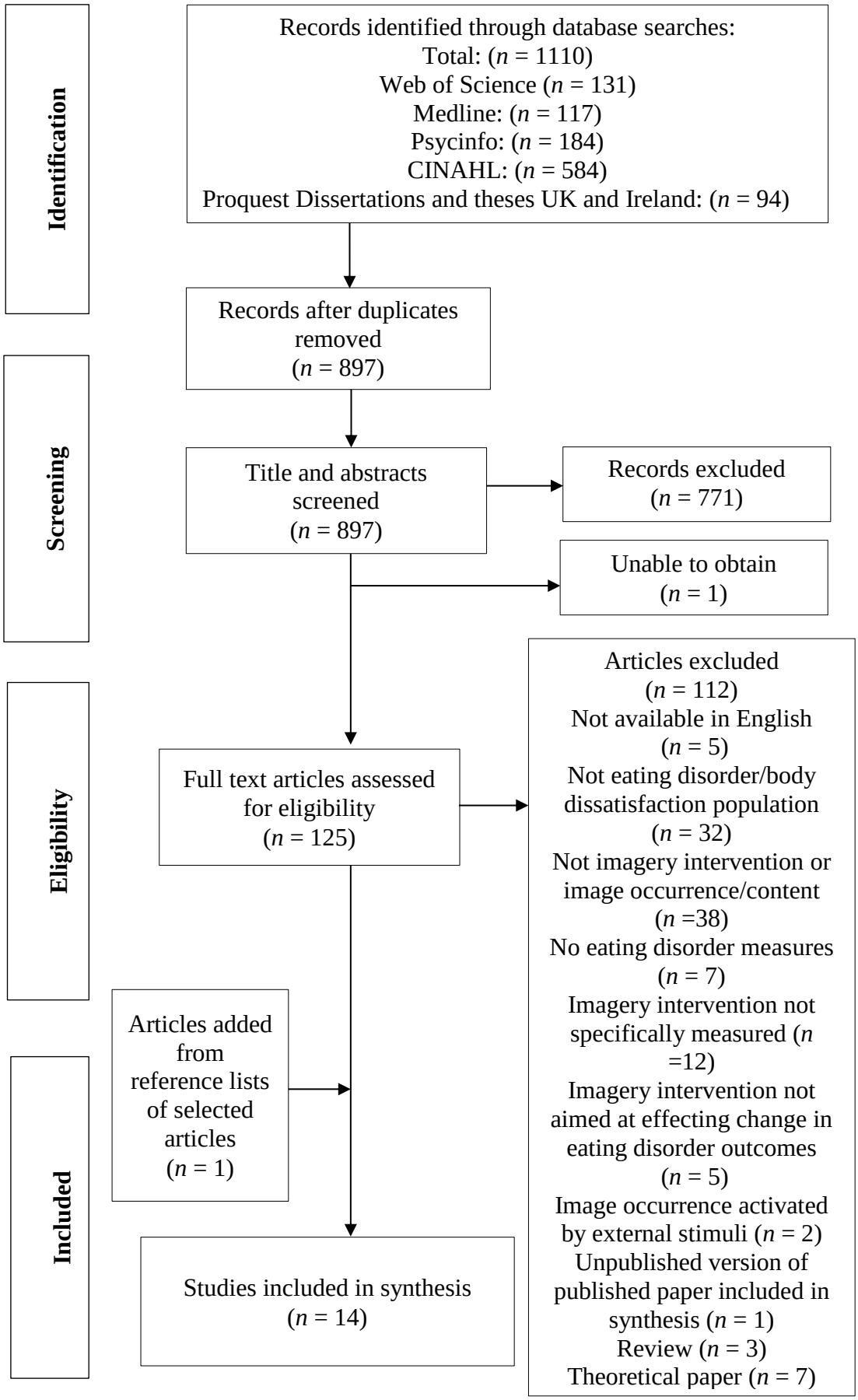


Figure 3. Flowchart of search results and study selection

1.3.2 Study descriptions

Tables 3 and 4 show full details of the studies. Table 3 includes details of all the intervention studies and brief details of the occurrence of images studies. Table 4 shows the details of the occurrence studies in more detail. Two of the studies were randomised controlled trials (RCTs), two were controlled clinical trials, four were case-control studies, two were cohort-analytical, two were case studies, one was a cohort study and one was a case series. Ten of the studies examined imagery interventions; there were three different imagery interventions used and nine key eating disorder features measured. Four studies examined the occurrence of spontaneous images. Eleven were conducted with only female participants and three included male and female. Sample sizes ranged from 1-66 and mean ages ranged from 19.7-52.3. Nine studies were conducted with clinical samples and five were conducted with non-clinical samples, with either high body dissatisfaction or high scores on eating disorder measures/behaviours. Samples were recruited from the general public, eating disorder outpatient and inpatient settings.

Table 3. *Study characteristics*

Reference	Design & aim	Sample characteristics	Intervention - N OR Method - N	Key eating disorder features	Measurement tool	Key findings (effect sizes where available in paper, if not available, *p* values reported)
Cooper, (2011)	Case study To analyse effects of IR on core beliefs	1 female with BN Age not reported Opportunity sample, UK	1 session of imagery rescripting-1	Rational and emotional core beliefs	% ratings	Reduction in all emotional and rational belief ratings after session
Cooper, Todd & Wells (1998)	Case-control Investigate content, origins and consequences of beliefs in AN and BN	36 females: 12 with AN, 12 with BN, 12 healthy controls Mean age AN: 26 (7.9), BN: 25.7 (6.3), healthy controls: 25.7 (5.3)	Semi-structured interview - 36	Negative self-beliefs, feelings, thoughts and behaviours surrounding eating	Image and thought descriptions	Images present in some patients when thinking about a situation where felt bad about eating. Images related to content of negative thoughts. More info in table 4

Reference	Design & aim	Sample characteristics	Intervention - N OR Method - N	Key eating disorder features	Measurement tool	Key findings (effect sizes where available in paper, if not available, *p* values reported)
		Opportunity sample, UK				
Cooper, Todd & Turner (2007)	Controlled clinical trial To change emotionally held negative self-beliefs	24 females with BN Mean age experimental group: 24.9 (6.2), control group: 26.2 (7.2) Opportunity sample from three tertiary referral centres, UK	Semi-structured interviews – 24 Experimental - 12: upsetting memory discussed and core beliefs modified using imagery rescripting Control - 12: upsetting memory discussed and effects of beliefs on current functioning examined	Rational and emotional core beliefs	% ratings	Main effect of time for negative rational beliefs in both groups (p <.05); decrease in both groups following interventions Group x belief interaction effect for negative emotional beliefs (p<.001): experimental group greater decrease in negative emotional self-beliefs than controls. Main effect of time for self-blame beliefs (p<.001), decrease in both groups after intervention

Reference	Design & aim	Sample characteristics	Intervention - N OR Method - N	Key eating disorder features	Measurement tool	Key findings (effect sizes where available in paper, if not available, *p* values reported)
						Group x belief interaction effect for help/protection belief ($p<.01$): experimental group greater increase in help/protection beliefs than controls.
				Urge to restrict	Ratings from 0-100	Main effect of time on urge to restrict ($p<.01$), decrease in both groups after intervention
				Urge to binge	Ratings from 0-100	No effect on urge to binge
Dugue, Keller, Tuschen-Caffier & Jacon (2016)	Case-control To explore content and characteristics	61 males and females (72.2% female): 21 with BE, 19 anxiety and affective disorders (AAD),	Semi-structured interview - 61	Occurrence/ content of images	Description and VAS	Mental images experienced by all groups but more distressing, distracting and difficult to control in BE group. Images of social rejection caused desire to eat in BE group.

Reference	Design & aim	Sample characteristics	Intervention - N OR Method - N	Key eating disorder features	Measurement tool	Key findings (effect sizes where available in paper, if not available, *p* values reported)
	of mental images in people with binge eating behaviour (BE)	21 healthy controls Mean age BE: 43.34 (13.32), AAD: 52.32 (6.46), healthy controls 46.38 (11.1) Opportunity sample from inpatient clinic, Germany		Desire to eat Distress	VAS scales 0-100	More detail in table 4
Esplen, Garfinkel., Olmsted, Gallop &	Randomised controlled trial To test effectiveness	48 females and 2 males with BN Mean age experimental	Experimental – 24: 6 weeks guided imagery therapy	Binge/purge frequency	EDI and self-monitoring/ EAT-26	Main effect of time: reduction in binge/purge frequencies in both groups ($p<.001$/$p<.001$). Group x time interaction: Greater decrease over time in

Reference	Design & aim	Sample characteristics	Intervention - N OR Method - N	Key eating disorder features	Measurement tool	Key findings (effect sizes where available in paper, if not available, *p* values reported)
Kennedy (1998)	of a guided imagery intervention	group: 27.2 (6.3), control group: 26.1 (5.8) Opportunity sample from outpatient or day treatment clinic and newspaper adverts, Canada	Control – 26: 6 weeks of keeping personal journals of eating patterns and discussing with therapist			experimental than control group in bingeing and purging frequencies ($p<.001$) Experimental group: 25% symptom free, controls: 0% symptom free Group x time interaction: Reduction in experimental group but not controls on total EAT-26 score ($p<.001$), and bulimia ($p<.001$) and dieting ($p<.009$) subscales. Experimental group: 58% clinically significant improvement on EAT-26, controls: 10% clinically significant improvement

Reference	Design & aim	Sample characteristics	Intervention - N OR Method - N	Key eating disorder features	Measurement tool	Key findings (effect sizes where available in paper, if not available, *p* values reported)
				Drive for thinness, bulimia, body dissatisfaction, perfectionism, interpersonal distrust	EDI subscales	Significant group x time interaction: Reduction in experimental group but not controls in drive for thinness ($p<.001$), bulimia ($p<.001$), body dissatisfaction ($p=.04$)
Farrar, Stopa & Turner (2015)	Cohort analytical To examine effects of self-imagery based on body on aspects of self-concept	66 female participants with high body dissatisfaction Mean age positive imagery group: 20.18 (2.21), negative imagery group: 19.73 (1.63)	Positive imagery – 33: 1 session of generation of a positive self-image based on own body Negative imagery – 33: 1 session of generation of a negative self-image based on own body	Positive/negative explicit state self esteem	SSES	Positive self-esteem significantly decreased in negative group ($r=.82$) and significantly increased in positive group ($r=.7$). Negative self-esteem increased in negative group ($r=.74$) and decreased in positive group ($r=.65$)
				Implicit self-esteem	IAT	No significant difference in IAT ($r=.01$)

Reference	Design & aim	Sample characteristics	Intervention - N OR Method - N	Key eating disorder features	Measurement tool	Key findings (effect sizes where available in paper, if not available, *p* values reported)
		Opportunity sample from poster adverts at a university, UK		State body satisfaction	Likert scale 0-10	Body satisfaction significantly increased in positive group (r=.8) and decreased in negative group (r=.83)
				Affect	PANAS	Positive affect significantly decreased in negative group (r=.76) and increased in positive group (r=.64) Negative affect significantly increased in negative group (r=.74) and no difference in positive group (r=.3)
Harlowe, Farrar, Stopa &	Cohort analytical	66 female participants with rates of eating pathology on	Positive imagery – 33: 1 session of generation of a	Positive/negative explicit state self esteem	SSES	Positive self-esteem significantly increased in positive group (r=.54) and significantly decreased in

Reference	Design & aim	Sample characteristics	Intervention - N OR Method - N	Key eating disorder features	Measurement tool	Key findings (effect sizes where available in paper, if not available, *p* values reported)
Turner (In press)	To examine effects of self-imagery based on global self, on aspects of the self-concept	EDE-Q 1 SD above community mean. Median age positive imagery group: 19; negative imagery group: 19. Opportunity sample from poster adverts at a university, UK	positive self-image based on whole self Negative imagery – 33: 1 session of generation of a negative self-image based on whole self	Implicit self-esteem Affect	IAT PANAS	negative group (*r*=.8). Negative self-esteem significantly increased in negative group (*r*=.84), significantly decreased in positive group (*r*=.72). No difference in IAT Positive affect significantly decreased in negative group (*r*=.74) and increased in positive group (*r*=.67). Negative affect significantly increased in negative group (*r*=.8) and decreased in positive group (*r*=.43)
Hinrichsen, Morrison, Waller &	Case series	27 females and 3 males: 4 with AN, 22 with BN, 4	Semi-structured interview about a	Ratings of core beliefs and	SIS-ED	Thoughts related to defectiveness/shame/

Reference	Design & aim	Sample characteristics	Intervention - N OR Method - N	Key eating disorder features	Measurement tool	Key findings (effect sizes where available in paper, if not available, *p* values reported)
Schmidt (2007)	To investigate the roles of core beliefs and imagery in triggering vomiting	with eating disorder not otherwise specified Mean age AN: 23 (5.7), BN: 29.6 (26.5), eating disorder not otherwise specified: 24.8 (9.7) Opportunity sample from eating disorder service, UK	recent time they had vomited	feelings prior to vomiting Occurrence /content of images in mind before vomiting	Discussion	failure/social isolation core beliefs before vomiting Feelings of guilt/shame and anxiety/worry before vomiting Feelings increased urge to vomit Some experienced images before vomiting some of which were linked to past memory. More detail in table 4

Reference	Design & aim	Sample characteristics	Intervention - N OR Method - N	Key eating disorder features	Measurement tool	Key findings (effect sizes where available in paper, if not available, *p* values reported)
Moreno-Dominguez, Rodriguez-Ruiz, Fernandez-Santaella, Jansen & Tuschen-Caffier (2012)	Controlled clinical trial To evaluate effectiveness of pure mirror exposure (PME), guided mirror exposure (GME) and guided imagery exposure (GIE)	31 females with body dissatisfaction Mean age: 20.12 (1.76) Opportunity sample from poster adverts at a university, Spain	5 sessions of 40 mins twice a week for one week in all conditions: PME – 10: look freely at body in mirror and describe it GME – 10: look at body in mirror and describe selves precisely by answering therapist's questions GIE – 11: not in front of a mirror, describe body through mental representation using same questions as in GME	Body dissatisfaction	BSQ	Main effect of time for body dissatisfaction: reductions in all groups following interventions (ηp^2=.57). Group x time interaction: reductions larger for PME than for GIE or GME (ηp^2=.16). PME significantly lower than GIE at follow-up (p<.02).
				Negative thoughts	TCL	Main effect of time for negative thoughts: reduction in all groups post intervention (ηp^2=.46). Group x time interaction for negative thoughts (ηp^2=.22). Only PME and GME significant reductions at post intervention and at follow-up.

Reference	Design & aim	Sample characteristics	Intervention - N OR Method - N	Key eating disorder features	Measurement tool	Key findings (effect sizes where available in paper, if not available, *p* values reported)
Ohanian (2002)	Case study To evaluate effectiveness of imagery rescripting in BN	1 female with BN 22 years old Opportunity sample, from eating disorder service, UK	1 session of imagery rescripting	Binge/purge frequency	Self-report discussion	75% reduction between imagery rescripting session and follow-up
Schmidt & Martin (2016)	Randomised controlled trial To compare efficacy of neurofeedback, mental imagery and waitlist	57 females with regular occurrence of subjective binge episodes (SBE's) and restrained eating	10 sessions over 6 weeks in all conditions. NFG and MIG presented with 10 pictures of foods and instructed to imagine then removed	SBE and resulting distress	Self-report questionnaire and 0-6 rating scale	SBE significantly lower in NFG compared to WLG (Hedges g=.65) but no significant difference in MIG compared to WLG. NFG less frequent binge episodes post treatment

Reference	Design & aim	Sample characteristics	Intervention - N OR Method - N	Key eating disorder features	Measurement tool	Key findings (effect sizes where available in paper, if not available, *p* values reported)
		Mean age neurofeedback group (NFG): 45.72 (13.91), mental imagery group (MIG): 43.72 (13.64), waitlist group (WLG): 44.86 (17.84) Opportunity sample from adverts, Germany	followed by self-regulation phases: NFG: participants watched feedback of brain potentials and instructed to reduce high beta activity by any choice of self-regulation strategies MIG: instructed to imagine pleasant and vivid imagery			compared to WLG (Hedges g=.67) but MIG did not Distress significantly lower in NFG vs WLG (Hedges g=1.36) and in MIG than WLG (Hedges g=.9) At follow-up compared to baseline, NFG and MIG significantly lower SBE and distress.
Shapiro et al. (2008)	Cohort To compare Progressive muscle relaxation	64 females with AN Mean age: 27.8 (13.3)	One session of 45 mins after lunch each day for 3 weeks, participants changed group each day:	Intensity of negative thoughts about weight gain	Rating scale 0-11	GI significant reduction in intensity of thoughts about weight gain ($p<.0001$)

Reference	Design & aim	Sample characteristics	Intervention - N OR Method - N	Key eating disorder features	Measurement tool	Key findings (effect sizes where available in paper, if not available, *p* values reported)
	(PMR), guided imagery (GI), self-directed relaxation (SR) and control group (CG) for post-meal anxiety in AN	Opportunity sample, from inpatient eating disorder service, USA	PMR: instructed to tighten and relax muscles – 64. GI: instructed to direct imagination to various imagery scripts e.g mountain tops – 64 SR: instructed to self-select relaxing activity e.g music – 64 CG: instructed to engage in activity of their choice – 64			No differences between interventions for thoughts about weight gain
Somerville & Cooper (2007)	Case-control	51 female participants: 13 BN, 18 dieting	Semi-structured interview about a recent time they'd	Image/negative core belief occurrence	Discussion of images and beliefs	12 BN reported images, 14 dieting controls and 11 non-dieting controls reported

Reference	Design & aim	Sample characteristics	Intervention - N OR Method - N	Key eating disorder features	Measurement tool	Key findings (effect sizes where available in paper, if not available, *p* values reported)
	To determine whether core beliefs can be accessed via spontaneous imagery	controls, 20 non-dieting controls Mean age BN: 27.46 (6.29), dieting controls: 28.06 (5.1), non-dieting controls: 28 (4.85) Opportunity sample from eating disorder clinic or adverts at university, slimming clubs, health clubs, hospital, UK	worried about eating, weight or shape	Ratings of rational and emotional core beliefs Distress and content of core beliefs	0-100 scales 0-100 scale and discussion of core beliefs	images. Possible to elicit core beliefs of people with BN via spontaneous images BN higher ratings of rational beliefs than dieting controls No significant difference in distress. Beliefs related to images concerned self-value, failure, self-control, physical attractiveness, stupidity, laziness, relation to others and weakness More detail in table 4 (same data for content and distress as in Somerville Hackmann & Cooper, 2007 study)

Reference	Design & aim	Sample characteristics	Intervention - N OR Method - N	Key eating disorder features	Measurement tool	Key findings (effect sizes where available in paper, if not available, *p* values reported)
Somerville, Cooper & Hackmann (2007)	Case-control To examine presence, content and characteristics of spontaneous imagery and links to childhood memories in BN and controls	51 female participants: 13 BN, 18 dieting controls, 20 non-dieting controls Mean age BN: 27.46 (6.29), dieting controls: 28.06 (5.1), non-dieting controls: 28 (4.85) Opportunity sample from eating disorder clinic or adverts at university, slimming clubs,	Semi-structured interview about a recent time they'd worried about eating, weight or shape	Frequency of images Characteristics of images/sensory modality/ perspectives taken within images/ characteristics of childhood memories associated with images	Numbers reported in interview Image descriptions	BN more likely to report spontaneous images than controls and images linked to childhood memory. Emotional tone in BN more negative More detail in table 4

Reference	Design & aim	Sample characteristics	Intervention - N OR Method - N	Key eating disorder features	Measurement tool	Key findings (effect sizes where available in paper, if not available, *p* values reported)
		health clubs, hospital, UK				

Abbreviations in table: AAD=affective and anxiety disorders, AEMS=Aloneness/Evocative Memory Scale, BDI-V=Beck Depression Inventory, BSQ=Body Shape Questionnaire, EAT=Eating Attitudes Test, EDI=Eating Disorder Inventory, FCQT=Food Cravings Questionnaire-Trait, GI=guided imagery, GIE=guided imagery exposure, GMI=guided mirror exposure, IAT=implicit association test, MIG=mental imagery group, NFG=neurofeedback group, PANAS=positive and negative affect scales, PME=pure mirror exposure, PMR=progressive muscle relaxation, PSQ=Perceived Stress Questionnaire, SBE=subjective binge episode, SBS=state body satisfaction, SDI=self-discrepancy index, SDS=subjective discomfort scale, SIS-ED=The Schema Identification Scale for Clients with Eating Disorders, SR=self-directed relaxation, SRS=Soothing Receptivity Scale, SSES=state self-esteem scale, SUIS=The Spontaneous Use of Imagery Scale, TCL=The Thoughts Checklist, VAS=visual analogue scale, WLG=waitlist group

1.3.3 Image occurrence

Four studies (Cooper, Todd & Wells, 1998; Dugue, Keller, Tuschen-Caffier & Jacob, 2016; Hinrichsen, Morrison, Waller & Schmidt, 2007; Somerville, Cooper & Hackmann, 2007) examined the prevalence of spontaneous images. Brief details of these studies can be seen in Table 3 and can be seen in more detail in Table 4. The studies demonstrated spontaneous images occur more often in people with eating disorders than in those without, and that the images are varied.

Prevalence of images

Two studies (Cooper et al., 1998; Somerville et al., 2007) examined the prevalence of images in clinical groups, AN and BN, compared to non-clinical groups. One study (Hinrichsen et al., 2007) looked at participants with BN and another (Dugue et al., 2016) compared people with binge eating, dieting controls and non-dieting controls. The percentage of people in clinical groups reporting occurrence of spontaneous images before vomiting/bingeing or feeling guilty about eating, ranged from 50%-85% with people with BN reporting the highest number of spontaneous images. Where clinical groups were compared to non-clinical groups, prevalence of spontaneous images was higher in the clinical groups.

Characteristics of images

All four studies found images concerning negative interactions with other people in the form of negative comments, being humiliated, being pressured to eat or social rejection. Three studies (Cooper et al., 1998; Dugue et al., 2016; Somerville et al., 2007) found images that were concerned with weight and shape, for example images of having a ‘round tummy after eating’ or ‘body growing, expanding’. Two studies (Hinrichsen et al., 2007; Somerville et al., 2007) reported that the images were linked to a past memory. The images in the Cooper et al. study were also reported to be linked to beliefs about the self, such as ‘I’m a failure’.

Where clinical and non-clinical groups were compared, Hinrichsen et al. (2007) found that the number of people reporting a link between the image and a past memory was much higher in the BN group than in the controls and Somerville et al. (2007) found the emotional tone of images in the BN group was more negative than in the control

groups. Furthermore, Dugue et al. (2016) found that those with binge eating reported significantly more images of food, shape and negative self than those without binge eating.

Relationship between images and eating pathology

Two studies (Cooper et al., 1998; Hinrichsen et al., 2007) suggested that images may play a role in triggering aspects of eating pathology, either as triggers for binges (Cooper et al., 1998) or vomiting (Hinrichsen et al., 2007) in people with BN. Two studies (Cooper et al., 1998; Dugue et al., 2016) reported increased distress from the mental images in people with BN and binge eating as well as images being hard to ignore and control.

When comparing clinical and non-clinical groups, Dugue et al. (2016) found people with binge eating experienced more distress, and were more distracted by the images than people without binge eating with the largest effect for differences in distress during mental images of food in people with binge eating compared to healthy controls. The same study also found desire to eat was higher during images of food, shape and social rejection in the binge eating group than in either the affective and anxiety disorders control group or the healthy control group.

Table 4. *Characteristics of image occurrence studies*

Reference	Spontaneous images		
	Prevalence – N	Content	Relationship with eating pathology
Cooper, Todd & Wells (1998)	AN group – 7/12 (58%) BN group – 6/12 (50%) Control group – 0/12 (0)%)	All visual images reported AN: Gaining weight, being pressured to eat, comparison to other women. BN: gaining weight, self-induced vomiting	AN: Not reported BN: bingeing intensified images, images more accessible, harder to ignore, increased distress. 8 BN patients identified images as triggers for binges
Dugue, Keller, Tuschen-Caffier & Jacob (2016)	Individuals with binge eating (BE group) behaviour group – 2/3's (food, shape, social rejection, negative self) (66.6%) Individuals with anxiety and affective disorders (AAD group) – 1/3 (33.3%) (food), 2/3's (66.6%) (shape)	All groups: Food, Shape, Weight, Home alone, Achievement, Failure, Positive self, Negative self, Positive social interaction, Social rejection Cramer's V shows medium sized association between group and mental images of food (V=0.33) and large	Desire to eat above 50 on VAS scale in BE group for food, failure, negative self and social rejection. BE group more desire to eat during mental images of food/ shape/social rejection than AAD group (Hedge's g =

	Healthy controls – 2/3's (66.6%) (food), 1/3 (33.3%) (shape)	association between group and mental images of shape (V=0.51) and negative self (V=0.58). No differences between groups in occurrence of images relating to: weight, home alone, achievement, failure, positive self, positive social interaction and social rejection.	1.12/1.02/0.95) and healthy controls (Hedge's g = 0.94/1.77/1.16). BE more desire to eat during mental images of being home alone/negative self than AAD group (Hedge's g = 1.42/1.16) BE group more DTE during mental images of achievement than healthy controls (Hedge's g = .1.06) BE group more distress during mental images of food than AAD group and healthy controls (Hedge's g = 1.62/2.13) BE group more distracted/less able to control occurrence of images than AAD group/healthy controls (Hedge's g = 1.73/1.45 and 0.42/1.28)
Hinrichsen, Morrison, Waller & Schmidt (2007)	57% reported occurrence 53% reported images to be recurrent	Two themes: (1) being humiliated or abused and (2) being abandoned 37% reported link to memory from past	Suggestion that images may play a role in triggering vomiting

Somerville, Cooper & Hackmann (2007)	BN – 85% (92% of these reported images as recurrent) Dieting controls – 56% (57% of these reported images as recurrent) Non-dieting controls – 50% (73% of these reported images to be recurrent) BN women more likely to report images (p = .04)	BN: emotional tone more negative than dieting controls/non-dieting controls (p=.002/.007) and associated with higher levels of anxiety than dieting controls/no-dieting controls (p=.001/001) % of images that were visual: BN - 92%, dieting controls - 93%, non-dieting controls - 100% BN – 67%, dieting controls – 21%, non-dieting controls – 18% reported links between image and childhood memory. Themes were: negative comments from family/others about weight/shape and self-consciousness about appearance	Not reported

Abbreviations in table: VAS=visual analogue scale

1.3.4 Effectiveness of imagery techniques

Three different imagery techniques were used in the studies; four studies explored the effects of guided imagery, three explored imagery rescripting and two explored self-imagery. One study explored the use of imagery to access core beliefs.

Guided imagery

Four slightly different guided imagery interventions were used; one study (Esplen, Garfinkel., Olmsted, Gallop & Kennedy, 1998) involved 6 weeks of guided imagery therapy incorporating two types of guided imagery exercises: one incorporated images that promoted comfort and relaxation (e.g. a meadow or other places of safety and serenity) and the other exercises promoted a self-exploration through metaphorical descriptions (e.g. viewing one's self as a colour and observing changes). A new exercise was introduced each week and participants had to practise the exercise for the week, once each day.

Another study (Schmidt & Martin, 2016) instructed participants to imagine pleasant and vivid imagery for 35 minutes whilst a beach was presented on a screen, after being exposed to pictures of foods often eaten during episodes of binge eating. The third study (Shapiro et al., 2008) instructed participants to direct their imagination in various imagery scripts such as 'mountain tops' and 'visualising change' for 45 minutes after eating, once each week for three weeks. The fourth study (Moreno-Dominguez, Rodriguez-Ruiz, Fernandez-Santaella, Jansen & Tuschen-Caffier, 2012) used an exposure based guided imagery technique where participants described their body through mental representations by being asked a series of questions to guide them through their descriptions.

Two of the studies (Esplen et al.,1998; Schmidt and Martin, 2016) found binge episodes reduced after the guided imagery intervention. Espen et al. found there was a greater decrease in the guided imagery group compared to the control group over time whilst Schmidt and Martin found no difference in decreases between the guided imagery group and control group. Esplen et al. also found a reduction in purge frequencies in the guided imagery group and a greater decrease over time in the guided imagery group compared to the control group. Esplen et al. also found 25% of the guided imagery group were symptom free whereas 0% of the control group were symptom free and 58% of guided imagery group showed a clinically significant improvement on the Eating Attitudes

Test-26 (EAT-26) whereas only 10% of the control group showed a clinically significant improvement.

Esplen et al (1998) and Schmidt & Martin (2016) found superior effects for the guided imagery intervention compared to the comparison groups for various other outcomes: Esplen et al. found reduction in guided imagery group but not control group in drive for thinness, bulimia, body dissatisfaction, total EAT-26 score, and bulimia and dieting subscales; Schmidt and Martin found distress related to bingeing lower in the mental imagery group than the waitlist group (Hedges g=.9). Also in comparison to a control group, Shapiro et al. (2008) found a significant reduction in intensity of thoughts about weight gain in the guided imagery group but this reduction was not significantly greater than the reduction in the control group.

The Moreno-Dominguez et al. (2012) study compared guided imagery with pure mirror exposure and guided mirror exposure. They found that guided imagery reduced body dissatisfaction and negative thoughts but was less effective than the comparison groups. For body dissatisfaction there were significantly larger reductions in the pure mirror exposure group compared to the guided imagery exposure group. Similar results were found for negative thoughts about the self; there was a reduction in all groups and a significantly larger reduction in the pure mirror exposure group than in the guided imagery exposure group.

These findings suggest that guided imagery interventions based on imagining pleasant or relaxing scenes can reduce eating pathology and intensity of thoughts related to weight, whilst guided imagery focusing on one's own body can reduce negative thoughts about the self. These findings suggest guided imagery may be a useful addition to current eating disorder treatments.

Imagery rescripting

All three studies (Cooper, 2011; Ohanian, 2001; Cooper, Todd & Turner, 2007) described using imagery rescripting in a single session and focusing on a distressing memory from early life in people with BN. Two of the studies were case studies (Cooper, 2011; Ohanian, 2001) and one compared a group of patients who received one session of imagery rescripting with a group of patients who did not receive imagery rescripting.

Two of the studies (Cooper, 2011; Cooper, Todd & Turner, 2007) found a reduction in core belief ratings for rational beliefs (the actual belief) and emotional beliefs (the feeling associated with the belief). Data to calculate effect sizes was not available;

however, decreases in negative emotional beliefs were bigger in the experimental group than the control group. This study also found bigger increases in help/protection beliefs in the experimental group than the control group. Two studies found effects on eating pathology; Ohanian (2001) reported a 75% reduction in binge and purge frequency after the imagery rescripting session and Cooper, Todd and Turner reported a decrease in urges to restrict.

Self-imagery

Both studies (Farrar, Stopa & Turner, 2015; Harlowe, Farrar, Stopa & Turner, In Press) included one session of a self-imagery exercise guided by a script read out by the researcher and both studies were conducted with non-clinical populations. Two slightly different self-imagery interventions were used; Farrar et al. asked the participant to think of either a positive/negative image of their body whilst Harlowe et al. asked participants to think of either a positive/negative image of the self as a whole rather than focusing specifically on the body.

Both studies found that explicit positive state self-esteem increased and explicit negative state self-esteem decreased after the positive imagery intervention. For the increase in positive state self-esteem, effect sizes were larger for the study where imagery was of the body (r=.7 vs r=.54) whereas for decreases in negative state self-esteem, effect sizes were slightly larger in the study where imagery was of the whole self (r=.72 vs r=.65). Both studies found positive state self-esteem decreased and negative state self-esteem increased after the negative imagery intervention. For decreases in positive state self-esteem, effect sizes were similar in both studies (body/whole self: r=.82/.8) and for increases in negative state self-esteem, effect sizes were larger in the study where imagery focused on the whole self (r=.84 vs r=.74). Both studies found no difference in implicit state self-esteem after either intervention. The study exploring self-imagery of the body also examined the effects on state body satisfaction and found this increased after positive imagery and decreased after negative imagery with similarly large effect sizes for both interventions (r=.8/r=.83).

Imagery to access core beliefs

The final study (Somerville & Cooper, 2007) used imagery to access core beliefs during assessment. They found that negative core beliefs were successfully accessed through a semi-structured interview where participants were asked about any images that

had occurred when people with BN, dieting controls and non-dieting controls had been worried about their eating, weight or shape.

1.3.5 Quality assessment

All 14 studies were assessed using the QATAS and rated on each of the 6 sections. Two of the studies had overall ratings of ‘strong’, six studies had overall ratings of ‘moderate’ and six studies had overall ratings of ‘weak’. One of the studies used a population ‘very likely’ to represent the target population and four studies used populations ‘somewhat likely’ to be representative of the target population. Nine of the studies’ populations were either ‘not likely’ or it was unclear whether they represented the target population due to the way they were recruited (often through adverts). None of the studies incorporated blinding of the assessor or the participants. Six of the studies used both reliable and valid measurement tools, two used tools that were either shown to be reliable or valid and five did not use reliable or valid tools. Seven of the studies had completion rates over 80%.

The two studies rated as ‘strong’ had populations that were somewhat likely to be representative of the target population, one was a case-control and one was an RCT. They both ensured no differences between groups prior to the intervention, they had low attrition rates and used valid and reliable measures. Of the studies scoring moderate or weak, nine had selection biases and two of them did not control for confounding variables. The ratings for each study can be seen in Table 5.

Table 5. *Quality ratings for each study*

Study	Study type	Selection bias	Study design	Confounders	Blinding	Data collection method	Withdrawals and dropouts	Global rating
Cooper, (2011)	Intervention.	Weak	Weak	N/A	Weak	Weak	N/A	Weak
Cooper, Todd & Wells (1998)	Observational	Weak	Moderate	Weak	Moderate	Weak	N/A	Weak
Cooper & Turner (2007)	Intervention	Moderate	Strong	Strong	Moderate	Weak	Strong	Moderate
Dugue, Keller, Tuschen-Caffier & Jacon (2016)	Observational	Moderate	Moderate	Moderate	Moderate	Strong	Strong	Strong
Esplen, Garfinkel., Olmsted, Gallop & Kennedy (1998)	Intervention	Moderate	Strong	Strong	Moderate	Moderate	Strong	Strong

Farrar, Stopa & Turner (201	Intervention	Weak	Moderate	Strong	Moderate	Strong	Strong	Moderate
Harlowe, Farrar, Stopa & Turner (Submitted)	Intervention	Weak	Moderate	Strong	Moderate	Strong	Strong	Moderate
Hinrichsen, Morrison, Waller & Schmidt (2007)	Observational	Moderate	Weak	N/A	Moderate	Weak	Strong	Weak
Moreno-Dominguez, Rodriguez-Ruiz, Fernandez-Santaella, Jansen & Tuschen-Caffier (2012)	Intervention	Weak	Strong	Strong	Weak	Moderate	Weak	Weak
Ohanian (2002)	Intervention	Weak	Weak	N/A	Moderate	Weak	N/A	Weak

Schmidt & Martin (2016)	Intervention	Weak	Strong	Strong	Moderate	Strong	Moderate	Moderate
Shapiro et al. (2008)	Intervention	Strong	Moderate	N/A	Moderate	Weak	Strong	Moderate
Somerville & Cooper (2006)	Intervention	Weak	Moderate	Weak	Moderate	Strong	N/A	Weak
Somerville, Cooper & Hackmann (2007)	Observational	Weak	Moderate	Strong	Moderate	Strong	N/A	Moderate

1.4 Discussion

1.4.1 Summary of findings

This review aimed to explore the role mental images play in the eating disorders and those at risk of eating disorders by determining the prevalence and characteristics of spontaneous images and the effectiveness of imagery techniques in treating key features of the eating disorders. The search identified 14 articles to review which were assessed for quality using the QATAS.

Spontaneous images

Four of the articles examined the prevalence and characteristics of spontaneous images. All of the studies found spontaneous images to be present in people with an eating disorder and the content of these images was varied. Some of the images were related to similar negative thoughts about the self (Cooper et al., 1998) which is in line with previous research that suggests images and thoughts contain similar content (Cooper, 2009). This was also supported by the Somerville and Cooper (2006) study demonstrating that core beliefs can be accessed via imagery.

The studies found some links between the occurrence of the images and eating pathology by suggesting the images may trigger bingeing and vomiting in people with BN. It must be noted that these conclusions were tentative and not causal in nature. However, given that the cognitive model of BN proposes that negative beliefs and thoughts about the self trigger negative emotions and subsequent bingeing and purging, the presence of images suggests they may drive behaviour in a similar way and are potentially important maintaining factors of the eating disorders.

The fact that the prevalence of spontaneous images was higher in clinical populations compared to non-clinical controls also suggests that the presence of negative imagery plays a role in the eating disorders, perhaps either as a risk factor for developing an eating disorder, a maintaining factor, or both. People with eating disorders also seem to respond to the images in a different way to those without, as the images were linked to more distress and desire to eat in participants with eating disorders. This fits with the transdiganostic model's suggestion that mood intolerance is a maintaining process in the eating disorders; perhaps the difficulties managing the emotions associated with the images that occur serves to maintain the eating disorder.

Diagnoses of AN, BN and binge eating were included in these studies, displaying some evidence for the occurrence of spontaneous imagery in the three main eating disorders. However, three of the four studies included participants with BN and therefore the results may be mainly applicable to that diagnosis and further research is needed in other diagnoses. In particular it would be helpful to conduct research in people who present with Other Specified Feeding or Eating Disorders (OSFED) which are feeding or eating behaviours that cause significant distress and impairment in functioning but do not meet the criteria for any other eating disorder (APA, 2013). Given a significant percentage of people present with OSFED in eating disorder services and it is the most prevalent eating disorder diagnosis (Thomas, Vartanian & Brownell, 2009), it is important to ascertain whether imagery is also a maintaining factor in this group.

Effectiveness of imagery techniques

Nine studies examined the effectiveness of imagery techniques in relation to their potential to facilitate positive change in key aspects of the eating disorders. Guided imagery improved body satisfaction, reduced binge/purge frequencies, negative core belief ratings and intensity of thoughts about weight gain. Guided imagery is thought to be effective through its effect on one's ability to modulate negative emotions (Esplen & Garfinkel, 1998). Research suggests that individuals with BN have difficulty self-soothing and modulating affect (Swift & Letven, 1984) as depicted in the transdiagnostic model and cognitive model of BN. The guided imagery interventions therefore are perhaps tackling the mood intolerance aspect of the transdiagnostic model and the emotion part of the cognitive model of BN by increasing people's ability to self-soothe and manage difficult emotions. This is likely to reduce the binge/purge frequencies and negative thoughts that follow this. It may also prevent the binge/purging happening if people are able to manage the negative affect triggered by negative core beliefs.

The four studies examining guided imagery included BN, AN and people with binge eating behaviours, suggesting it is a useful treatment across disorders. These findings need replicating however as the number of studies that have been conducted to date remains very small. Furthermore, three of the studies using guided imagery compared it to several different comparative treatments, for example progressive muscle relaxation or pure mirror exposure, rather than a control group. This made it difficult to compare effectiveness across studies or to see its effectiveness relative to a wait list control group.

Imagery rescripting reduced binge/purge frequencies, urges to restrict and negative core belief ratings. The modification of the negative core beliefs through the rescripting may be reducing binge/purge frequencies as the negative emotion associated with the beliefs that leads to the binge/purge frequencies or the restriction, is not activated or is not as negative as before, thus reducing the need to carry out one of the behaviours to manage the emotion. The results of imagery rescripting can only be applied to BN at this stage as all three of the studies involved people with BN. It must also be noted that two of the imagery rescripting studies were case studies and therefore further more robust trials need to be carried out to fully evaluate the effectiveness of this technique in people with BN, as well as in other eating disorders.

Positive self-imagery reduced body dissatisfaction and negative state self-esteem and increased positive state self-esteem. It is possible that retrieving a positive image of the self reduces the discrepancy that one has between the actual self and ideal self (Harlowe et al., In press) thus increasing one's self-esteem. Increasing self-esteem may reduce the need to control weight and shape as seen in the transdiagnostic model which may in turn affect other parts of the model such as the eating pathology itself. The positive self-imagery studies however were both conducted using sub-clinical populations and therefore need replicating in people with eating disorders. These studies show promise in their applicability in a clinical eating disorder population given that one used positive imagery of the body and one used positive imagery of the whole self. This demonstrates that the technique could perhaps be used flexibly depending on which aspect of an eating disorder presentation the intervention was trying to target. For example, if the intervention was trying to target body specific cognitions linked to the over-evaluation of weight and shape, using a positive image of the body may be useful for this. However, if the intervention was trying to target general core low self-esteem and views of the self, it may be useful to use an image of the whole self.

These results demonstrate that guided imagery, imagery rescripting and positive self-imagery interventions can be effective in improving key aspects of the eating disorders including eating pathology as well as aspects of the self, such as negative core beliefs and low self-esteem. From this review it appears that the guided imagery interventions show particular promise for use in people who struggle with mood intolerance and self-soothing through teaching people skills to improve their self-soothing and in turn reduce bingeing and purging as a way of managing emotions. Although only used in people with BN in this review, imagery rescripting shows promise in being effective for everyone given it is

thought to work through rescripting negative beliefs, which everybody has. Positive self-imagery also shows promise, particularly in tackling low self-esteem and affect. All of the imagery interventions show promise and at the moment, one does not seem more promising than another. The literature used to demonstrate this however, is not without its limitations.

1.4.2 Critical review of the literature

The results of the review provide similar findings to that of a previous review (Tatham, 2011) demonstrating the effectiveness of imagery techniques in CBT for the eating disorders. Strengths of the studies included are that the studies involved a range of nationalities suggesting the use of imagery techniques and the existence of spontaneous images is existent across countries, despite the exclusion of non-English articles. The inclusion of non-published studies is a strength as this reduced the risk of publication bias, however only non-published studies from the UK were searched.

Despite some strengths of the literature included, there were also several limitations. Almost half of the included studies were rated as 'weak' in terms of their quality and only two of the studies were rated as 'strong'. This suggests the quality of a lot of the studies and therefore their results are perhaps not very reliable and this highlights the need for further research with more rigorous methodologies.

Many studies were deemed to display a risk of bias in their sample due to their recruitment processes and therefore the generalisability of the results to populations with eating disorders or those at risk must be tentative. Indeed, the studies involving only non-clinical populations screened the participants using self-report measures only and only used volunteers, making them unlikely to represent people genuinely at risk of developing an eating disorder.

More than half of the intervention studies did not include a control group making it difficult to evaluate the effectiveness of the interventions. Many studies included comparative treatment groups, however the range of different comparative treatments made it difficult to compare the effectiveness of different imagery interventions relative to other treatments.

Furthermore, there was a range of imagery interventions used in the studies as well as many different eating disorder features explored, making it difficult to draw direct comparisons about the effectiveness of interventions on various key eating disorder

features. In addition, the majority of papers did not report effect sizes or provide the data needed to calculate an effect size, thus making it difficult to draw direct comparisons. The range of sample sizes (1-66) also made it difficult to compare results. Furthermore, only one of the studies (Moreno-Dominguez et al., 2012) included follow-ups meaning there is no way of knowing if the effects of the imagery interventions or the occurrence of spontaneous images is sustained.

The measures used in the studies were not all reliable and valid with some studies using scales they had developed themselves for the study (e.g Shapiro et al., 2008). In the studies where an imagery interview was used relying on memories of a previous time where the participant had binged, vomited or felt guilty about eating, there was no way of evaluating how reliable a participant's memory was and the extent to which they may have been led by questions in the interview, making the reliability of the results from these studies questionable.

In some of the intervention studies however, for example Farrar et al. (2015) and Harlowe et al. (In press), the vividness of the image was asked about to ensure that people had images that were vivid enough to effect change. This was a strength of these two studies as previous research has demonstrated that the vividness of an image can impact outcomes. For example, research assessing imagery vividness in people with depression found that the more vivid people's images about taking part in various activities were, the greater their increase in behavioural activation and reduction in depressive symptoms (Renner, Ji, Pictet, Holmes & Blackwell, 2017). This is something that could potentially be useful to examine in relation to the other imagery interventions to explore whether vividness of imagery impacts the effectiveness of the interventions.

1.4.3 Limitations of the review

This review had various limitations which must be considered. In terms of the inclusion/exclusion criteria, the exclusion of articles not available in English may have introduced some bias and articles may have been missed. The exclusion of studies where imagery techniques were part of a wider intervention meant some studies were excluded which provided useful findings about imagery being successfully used as components of other interventions such as CBT (Mountford & Waller, 2006) and compassion based treatment (Duarte, Pinto-Gouveia & Stubbs, 2017). Furthermore, the inclusion of non-

clinical populations means it is unclear if there are differences between the effects on people with clinical eating disorders and those without.

The use of the QATAS to quality assess all the articles meant some articles received lower ratings than perhaps they deserved as some of the questions were not applicable, for example for case studies. Finally, the full text articles and the quality assessment ratings were only conducted by one reviewer which meant they could not be checked for inter-rater reliability.

1.4.4 Implications and future research

Despite this review's limitations, there are several implications from the findings. The findings suggest spontaneous images are a component of many people's experiences of eating disorders and that they have a potential maintaining effect in some of the key features, for example in triggering bingeing in BN. This is useful for clinicians assessing eating disorders to keep in mind, to ask about any images and their impact during the assessment, and to add them to their formulations where appropriate. Given that Somerville and Cooper (2006) demonstrated that imagery can be used to access core beliefs, it may be that some people are able to access their core beliefs more easily through being asked about images rather than being asked to describe them in words. Potentially triggers to bingeing or vomiting may also be elicited through asking about images, given that people reported them to be present just before bingeing or vomiting.

The findings that various imagery techniques are successful in effecting change in some of the key aspects of the eating disorders is useful for clinicians as they can incorporate some of the techniques into treatment such as guided imagery or imagery rescripting which have already been tested with clinical populations. Guided imagery could potentially be incorporated into treatment when tackling aspects of mood intolerance, given its hypothesised role in developing self-soothing and skills to manage affect. Imagery rescripting could potentially be used in the later stages of treatment when working with core beliefs, for example in CBT-ED when tackling low self-esteem; it could be incorporated if there were specific memories and images associated with some of the beliefs that had led to the development of low self-esteem. It may be that the use of the techniques is beneficial in conjunction with other treatments such as CBT-ED, however this is something which warrants further research.

The positive self-image retrieval techniques could benefit from future research using these in clinical populations, given the promise they have shown so far in non-clinical samples. Thus far, they have shown promise in tackling the low self-esteem aspect of the transdiagnostic model of eating disorders and could therefore be incorporated into this part of eating disorder treatment, if found to be effective in clinical populations. It could also be helpful to explore whether retrieving an image repeatedly increases its accessibility. A potential difficulty in using this in clinical populations may be that people with eating disorders have such low self-esteem that they find it difficult to access a positive self-image either of the body or of the whole self. It may be that positive image retrieval would be less useful in people with extremely low self-esteem and another imagery intervention such as imagery rescripting may need to be employed first to challenge some of the negative core beliefs, before trying to access a positive image of the self.

Future research would benefit from exploring the existence and content of spontaneous images in larger samples of people with varying eating disorders. The mental imagery interview is an appropriate methodology to assess occurrence, content and experience of mental imagery in clinical populations (Pearson, Deeprose, Wallace-Hadrill, Burnett Heyes & Holmes, 2013), however this could be built upon by supplementing studies with a more quantitative measure such as the Vividness of Visual Imagery Questionnaire (Marks, 1973). This would allow exploration of whether people who had very vivid images were more distressed by them which could aid clinicians' knowledge of when to tackle imagery, for example in people where it is very vivid and distressing.

The effectiveness of imagery techniques warrants further experimental testing with various eating disorders, with the use of control groups. The use of imagery techniques to effect change in aspects such as low self-esteem, negative core beliefs and affect, would also benefit from being compared against techniques that are commonly used in CBT-ED to tackle these aspects such as verbal based techniques, for example cognitive restructuring. This would provide useful information to determine whether images do effect more or less change than verbal strategies to help inform whether verbal and image content function in similar or different ways.

1.4.5 Conclusions

This systematic review explored the role of mental imagery in the eating disorders and those at risk of developing eating disorders. Evidence suggests spontaneous mental images exist in people with eating disorders when feeling guilty about eating or before bingeing/vomiting and that potentially these images are maintaining factors in the eating disorders, particularly in BN. Imagery rescripting and guided imagery can effect change in some key aspects of the eating disorders by tacking affect, self-esteem and negative core beliefs whilst positive image retrieval has shown promise in tackling low self-esteem and affect in non-clinical samples.

However, the results of the review must be interpreted with caution due to the methodological limitations in many of the studies. Further research is needed into the role of spontaneous images in eating disorders other than BN and research regarding imagery interventions needs to be conducted with more methodologically robust experiments. The review shows imagery provides a promising avenue to develop current eating disorder models and treatments.

Chapter 2 Empirical Paper: Comparing the effects of positive self-imagery versus cognitive restructuring on aspects of the self in people with disordered eating habits.

2.1 Introduction

Eating disorders are often characterised by a general negative sense of self (Cooper, 2009) and recent eating disorder models acknowledge that negative views of the self play an important role in the development and maintenance of eating disorders. As discussed in chapter 1, the cognitive model of BN (Cooper, Wells & Todd, 2004) conceptualises the role of the self in terms of schema content and core beliefs whereas the transdiagnostic model conceptualises the role of the self in terms of negative self-evaluations which contribute to self-esteem. Cognitions that make up these evaluations and beliefs about the self can take the form of both verbal thoughts and mental images with verbal thoughts consisting of words and sentences and images consisting of sensory representations (Hales, Blackwell, Di Simplicio, Lyadurai, Young, & Holmes, 2015). Images often contain similar content to negative thoughts and cognitive theorists suggest that images may drive behaviours in the same way as verbal thoughts (Cooper, 2009).

Currently, the role of imagery, and in particular self-imagery, is not included in any eating disorder models and treatments tend to focus on verbally based interventions, such as cognitive restructuring, to challenge and change negative views of the self. Research has, however, started to explore the role of imagery in people with eating disorders and some imagery based interventions, for example imagery rescripting and guided imagery, have been shown to effect change in various aspects of the eating disorders, including views of the self.

The aim of this paper is to add to the literature on the efficacy of imagery interventions in the eating disorders. The paper will first consider the existing literature on the role of the self and imagery in eating disorders. It will then report the results of an experimental study comparing the effects of an imagery intervention and a verbal intervention on aspects of the self in a population of people who have high levels of eating disorder cognitions. Finally, implications for clinical practice and suggestions for future research will be discussed.

2.1.1 The self in the eating disorders

The self has been defined in many different ways within psychology; however, in cognitive therapy the self is commonly conceptualised in terms of self-schemas that have been defined as "templates that represent connected beliefs about the self" (Luke & Stopa, 2009, p. 18). Beck et al. (1990) suggest that core beliefs form the content of the schema and that the schemas themselves are cognitive structures that organise information about the world (Beck, Rush, Shaw & Emery, 1979). Behaviours are driven by and develop as responses to the schema rather than being part of the schema (Young, Klosko & Weishaar, 2003). Schema processes and core beliefs, which represent two components of the self, have been studied in the eating disorders; the research suggests that negative core beliefs are characteristic of eating disorders and people with eating disorders have higher levels of negative core beliefs than non-clinical controls (e.g Dingemans, Spihoven & Van Furth, 2006). The research also suggests people with eating disorders use strategies to try and avoid schema activation and therefore schema processes are likely to be a maintaining factor and play a role in the development of eating disorders (Sheffield, Waller, Emanueli, Murray & Meyer, 2009). Eating disorder models have also started to incorporate the self, in the form of schemas and core beliefs.

Vitousek and Hollon (1990) highlighted the role of the self by incorporating self-schemas as a construct in the development of AN and BN. More recently, Cooper et al. (2004) incorporated the self in terms of negative self-beliefs in the maintenance and development of BN. Furthermore, the transdiagnostic model of eating disorders conceptualises the self in terms of self-esteem as a possible maintaining factor in various eating disorders (Fairburn et al., 2003). Self-esteem in this model is conceptualised as explicit self-esteem which is comprised of conscious and accessible beliefs about the self. However, self-esteem has been defined in social psychology as an active evaluative attitude towards the self (Demo & Savins-Williams, 1992), comprising both explicit and implicit (unconscious and automatic) attitudes towards the self (Greenwald & Farnham, 2000). Although promising that recent eating disorder models have started to incorporate the role of the self into their conceptualisations, these conceptualisations are still fairly limited; the transdiagnostic model only uses self-esteem to capture the role of the self and the cognitive model of BN only uses negative self-beliefs.

In cognitive models of other psychological disorders, the self is principally conceptualised as self-schemas; however, it has been argued that the conceptualisations of the self in psychopathology are too narrow and it is therefore important to widen our

conceptualisation of the self (Luke & Stopa, 2009). Luke and Stopa (2009) suggest the self is fluid and dynamic and is comprised of various different parts. They suggest that the self-concept, which is a global view of one's attributes, made up of the schemas that people have about themselves (Luke & Stopa, 2009) is important to consider when thinking about the self. They suggest that individuals construct different self-concepts depending on the situation which comprise the 'working self-concept'(Conway & Pleydell-Pearce, 2000). They also suggest that because different representations of the self are active at different times, there are likely to be discrepancies between different selves and different parts of the self-system, and that these self-discrepancies are also important to consider when thinking about the role of the self. The extent to which different aspects of the self are stable and internally consistent is represented by a construct called 'self-concept clarity' (Campbell, 1990) which is defined as the degree of certainty one has about their self-concept. However, self-concept clarity and self-discrepancies have not been studied in the eating disorders.

Self-concept clarity could be an important aspect of the self to consider in the eating disorders because of its links to self-esteem. Previous research has shown that discrepancies exist between implicit and explicit self-esteem in people with eating disorders; for example, Vanderlinden et al. (2009) found people with eating disorders have lower explicit self-esteem than controls but there was no difference in implicit self-esteem. Cockerham, Stopa, Bell and Gregg (2009) found that people with BN had lower explicit self-esteem but a positive implicit self-esteem bias compared to controls. Cockerham et al. (2009) suggest such discrepancies between implicit and explicit self-esteem may create uncertainty and difficulties in maintaining a consistent and stable view of the self. It follows therefore that people with eating disorders may have low self-concept clarity.

Low self-concept clarity is associated with low self-esteem (Campbell, 1990) as it is proposed that people with low self-concept clarity are more susceptible to, and more easily influenced by external self-relevant stimuli (Campbell, 1990). Low self-esteem is thought to maintain eating disorders by motivating individuals to achieve success in controlling their weight and shape to increase their feelings of self-worth, which in turn maintains their over-evaluation of weight and shape (Lampard et al., 2013). Therefore if an individual with an eating disorder were to see an external stimuli such as an image of themselves in the mirror, if they have low self-concept clarity, they are likely to be easily influenced by the image of themselves, which may lead to them wanting to do something to change the image, such as restrict their food intake, given that their self-esteem is

mainly based on their weight and shape. This desire to change their body may also be driven by trying to reduce discrepancies between their actual and ideal selves.

Self-discrepancies are conceptualised as the differences between how one views oneself (actual self) and how one would like to be viewed (ideal self) and this can affect the clarity with which one views oneself (Higgins, 1987). Large discrepancies between the self in different roles, between actual-ideal selves or between current and past selves might all influence the clarity with which one sees oneself (Luke & Stopa, 2009). Many people with eating disorders experience distorted negative views of themselves as too fat or too thin (Cash & Deagle, 1996), which creates a discrepancy between their actual view of self and how they would like to be. For example, Bers and Quinlan (1992) found higher actual-ideal discrepancies in people with AN compared to controls and Wonderlich et al. (2008) found higher actual-ideal discrepancies in people with BN compared to controls. It has been suggested that these self-discrepancies are associated with eating disorder behaviours in that they prompt the individual to pursue ideal standards by restricting, bingeing or purging for example (Wonderlich et al., 2008). They are therefore perhaps constantly striving to change the view of themselves, indicating that their view of themselves is unstable.

The self is a multi-faceted construct that is conceptualised in a limited way within current eating disorder models. Although self-esteem is an important aspect of the self to consider, it is related to other aspects such as self-concept clarity and self-discrepancies. Both of these aspects are likely to be relevant in eating disorder populations given their unstable view of themselves and body image distortions. Examining the impact of strategies that target these aspects of the self could help to inform future treatments.

2.1.2 Current eating disorder treatments

As mentioned earlier, cognitions can take the form of both verbal thoughts and mental images with both forms containing similar content (Beck, Laude & Bonhert, 1974) and driving behaviour in similar ways (Cooper, 2009). Historically, interventions in the eating disorders have mainly used verbally based interventions such as cognitive restructuring to target aspects of the self. Cognitive restructuring forms part of CBT-ED, one of the NICE (2017) recommended treatments for eating disorders. In cognitive restructuring patients are helped to identify negative views of the self and reappraise them by looking for facts that support and facts that not do not support the thought, to reach a more balanced view of their self-worth (Murphy, Straebler, Cooper & Fairburn, 2010).

Considering the evidence for and against a thought potentially reduces the actual-ideal discrepancy by highlighting that the gap is perhaps not as large as originally thought, thus increasing positive affect and reducing core low self-esteem (Kinderman & Bentall, 1997).

Evidence demonstrating the effectiveness of pure cognitive restructuring is sparse as cognitive restructuring is normally delivered as part of CBT for the eating disorders, and may be used to address a range of thoughts, including those related to low self-esteem. One study however examined the effects of cognitive restructuring for low self-esteem in a group of people with a range of eating disorders; Newns, Bell and Thomas (2003) found self-esteem, depression and eating attitudes improved after completing the group.

Although evidence for cognitive restructuring alone is sparse, the efficacy of CBT has been extensively researched in the eating disorders. Despite it being more effective than other treatments (Linardon et al., 2017), a large proportion of people do not benefit from CBT (Murphy et al., 2010). Given the role played by negative beliefs about the self in eating disorders and the knowledge that images often contain similar content to thoughts, mental imagery, in particular self-imagery provides a promising avenue to develop current eating disorder models and treatments. However, imagery interventions are not yet routinely incorporated into eating disorder treatments, even though they show promise in targeting and effecting change in aspects of the self.

2.1.3 Imagery in the eating disorders

Beck (1976) initially suggested that mental imagery might provide an avenue to exploring the meanings of beliefs that are the focus of cognitive therapy and recent literature suggests mental imagery may contribute to the maintenance of eating disorders. For example Somerville, Cooper & Hackmann (2007) found that people with BN experience recurrent spontaneous negative self-images when thinking about a time when they were worried about their eating, weight or shape, whilst Hinrichsen, Morrison, Waller and Schmidt (2007) found women with BN experienced negative self-images before vomiting.

The images in all of the studies described above included negative perceptions of the individual's body shape and size and people experienced shame, sadness and anxiety associated with the images. The images were also associated with feelings of abandonment and humiliation (Hinrichsen et al., 2007) or early memories of worthlessness and rejection (Cooper et al., 2007) and negative comments about appearance, weight and shape (Somerville et al., 2007). These findings suggest self-images may play a role in the

maintenance of eating disorders and in some cases can lead to behavioural symptoms of eating disorders (Hinrichsen et al., 2007).

There are currently three studies that used imagery rescripting and found that it was effective in challenging and reducing core belief ratings and negative thoughts. All three studies (Ohanian, 2002; Cooper, Todd & Turner, 2007; Cooper, 2011) described a single session of imagery rescripting of a distressing early memory in people with BN. There were no quantitative results for the impact of imagery rescripting in Ohanian's (2002) study, but Cooper (2011) and Cooper et al. (2007) both found reductions in belief ratings for 'emotional' ("I feel worthless") and rational beliefs. In this technique, relevant negative self-beliefs are identified along with an associated early memory that often comprises a significant part of the evidence for, or was the starting point for the negative self-beliefs that are hypothesised to maintain the eating disorder. The core beliefs are modified collaboratively with the patient with the aim of reducing the extent to which they believe them to be true in current life. The technique enables the patient to retrieve positive conceptual information which opposes the negative information in the memory. This then changes the emotional belief and relationship to the belief (Cooper, 2009). These three studies highlight that imagery rescripting can target an aspect of the self, negative self-beliefs, successfully in people with eating disorders. Other studies have demonstrated different imagery techniques can target other aspects of the self.

Two recent studies on imagery in analogue eating disorder populations have used Conway and Pleydell-Pearce's model to link imagery and the self in eating disorders. Conway and Pleydell-Pearce (2000) propose the idea of a Self Memory System (SMS) which suggests individuals have a long term self, made up of conceptual knowledge (beliefs and knowledge about the self) and autobiographical knowledge (including episodic memory), as well as a 'working self' or 'working self-concept'. The 'working self' can be understood as the 'online self' where images of the self can be activated in response to certain situations. A further theory that has been used to link imagery and the self is Bewin's retrieval competition hypothesis (2006). This suggests that different representations of the self compete for retrieval and repeated activation of a negative working self may increase its accessibility and reduce the accessibility of alternative positive representations, thus maintaining negative views of the self. Research in anxiety disorders, such as social anxiety, argues that self-images represent the working self (e.g Hulme, Hirsch & Stopa., 2012) and two recent studies have lent support to these ideas in populations similar to those with eating disorders.

Farrar, Stopa and Turner (2015) and Harlowe, Farrar, Stopa and Turner (In press) drew on Conway and Pleydell-Pearce's (2000) model to operationalise the working self using the two constructs - self-esteem and self-concept clarity - with Harlowe et al. also including actual-ideal discrepancies as an aspect of the working self. Both studies used analogue samples with Farrar et al. (2015) using participants high in body dissatisfaction and Harlowe et al. (In press) using participants with high levels of eating disorder cognitions. Farrar et al. (2015) found that retrieving and holding a positive image of the body based on an autobiographical memory led to an increase in explicit self-esteem, positive affect and increased body satisfaction whilst holding a negative image of the body based on an autobiographical memory in mind led to the opposite effects. Harlowe et al. (In press) also found holding a positive image of the whole self (not just of the body) also led to an increase in explicit self-esteem, positive affect and reduced self-discrepancies. In contrast to the Farrar et al. study, Harlow et al. found that holding the positive image also led to improved self-concept clarity.

The two aforementioned studies are examples of the working self, conceptualised in terms of self-esteem and self-concept clarity, being directly accessed and manipulated through imagery, in these cases by manipulating which self-representation is activated at a certain time. These studies demonstrated that the some aspects of the self, ie self-concept clarity, self-discrepancies and self-esteem can be targeted using imagery techniques and that conceptualising the working self in this way is potentially useful. Thus far no studies have directly compared whether targeting aspects of the self with an imagery based technique compared to a verbal technique produces different outcomes in people with disordered eating habits or eating disorders. Ohanian (2002) argues that the self-concept is developed at a time where cognitive material is more commonly encoded in visual, affective or kinaesthetic forms and therefore imagery can gain direct access to the schemas and core beliefs involved in self-esteem that verbal techniques cannot (Layden, Newman, Freeman & Morse, 1993).

Given the limited success with current verbally based eating disorder treatments, and the promise showed so far with imagery techniques, it is useful to compare whether targeting aspects of the self with an imagery based technique compared to a verbal technique produces different outcomes.

2.1.4 Aims and hypotheses

This study therefore aims to explore whether repeatedly accessing a positive self-image that is based on an autobiographical memory improves aspects of the self-concept, and whether any observed benefits differ from a cognitive restructuring intervention. The self will be conceptualised in terms of self-esteem, self-concept clarity and actual-ideal self-discrepancies based on the research discussed above.

The previous studies on self-imagery in populations with high levels of eating disorder cognitions or body dissatisfaction concluded that a single session of positive image retrieval may not have been powerful enough to reduce the perceived discrepancies between the actual-ideal self and that it is important to explore whether repeatedly accessing a positive image affects aspects of the self-concept (Farrar et al., 2015; Harlowe et al., In press). They also suggested it would be useful to explore whether there were any changes in eating habits after repeatedly accessing a positive self-image. In addition, the impact of the interventions on affect will be explored given that self-esteem, self-concept clarity and actual-ideal discrepancies are related to lower levels of affect, (Baumgardner, 1990; Cockerham et al., 2009; Higgins, 1987; McDaniel & Grice, 2008) therefore improvements in self-esteem, self-concept clarity or self-discrepancies may be related to improvements in affect. Furthermore, this study aims to deliver the intervention as similarly as possible to how it would be delivered in a clinical setting ie being taught the intervention and practising it at home each day.

It is hypothesised that both interventions will improve explicit self-esteem, self-concept clarity and affect, will reduce actual-ideal self-discrepancies and disturbed eating habits and that the imagery intervention may be more effective than the cognitive restructuring.

2.2 Method

2.2.1 Design

The study used a 3 x 2 repeated measures mixed design with one between-subjects factor (group) that had three levels (verbal, imagery, control) and one within-subjects factor (time) that had two levels (pre and post interventions). The dependent variables were state self-esteem, state self-concept clarity, positive and negative affect, actual-ideal self-discrepancies and disordered eating habits.

2.2.2 Inclusion/exclusion criteria

Eating disordered behaviours and concerns lie on a continuum with clinically significant eating disorders at one end and absence of eating disorder behaviour at the other end (Peck & Lightsey, 2008). Studies have indicated that 14-46% of individuals with eating disorder behaviours and concerns that do not reach criteria for a full eating disorder progress to an eating disorder within 2 years (Shisslak, Crago & Estes, 1995). Therefore, in order to obtain a population likely to be representative of people with eating disorders, participants were screened using the Eating Disorder Examination Questionnaire 6.0 (EDE-Q; Fairburn & Beglin, 1994) as described in the measures section below. Participants whose global score was over 2.7 (one standard deviation above the community sample mean (Fairburn & Beglin, 1994) were invited to take part in the experimental sessions as these people were deemed to have higher than average concerns about eating, weight and shape. Only adults were eligible for the study; anyone under 18 was excluded. Participants were recruited jointly with another researcher who needed a similar participant pool for a study exploring the effects of a self-compassion intervention on body satisfaction. A recruitment diagram can be seen in Appendix B.

2.2.3 Participants

Participants were female students, staff from a local university, and members of the local community. Participants were recruited via paper adverts (Appendix C) around the university campus and adverts on the university psychology research portal. 413 people completed the screening questionnaire and 188 were allocated to this study. Of those, 101 were eligible to take part and were invited to attend the experimental sessions. 29 people did not respond to the invitation and therefore 72 participants completed the first

experimental session. 69 completed both sessions; one participant did not attend the second session and two participants withdrew due to unforeseen circumstances. 3 participants were excluded due to missing out large sections of the questionnaires. The final sample consisted of 3 groups with 22 participants in the control group (*Mean age* = 23.45, *SD* = 7.91), 22 participants in the imagery group (*Mean age* = 23, *SD* = 5.98) and 22 participants in the verbal group (*Mean age* = 22.55, *SD* = 8.5). 68.2% of the whole sample were White British and 78.8% were undergraduate students.

2.2.4 Measures

The following measure was used to screen participants:

Eating Disorder Examination Questionnaire (EDE-Q; Fairburn & Beglin, 1994)

This is a 31 item self-report questionnaire which measures thoughts and behaviours regarding eating, weight and shape over the past 28 days. The questionnaire yields four subscale scores reflecting the severity of aspects of eating disorder psychopathology (restraint, eating concern, weight concern, shape concern) and a global score. Example questions include 'have you felt fat?' and participants must rate how often, in the last 28 days, this has been the case on a scale of 0 (no days) to 6 (every day). The questionnaire also provides data on the frequency of behaviours in terms of the number of episodes or number of days a behaviour occurred in the past 28 days. The EDE-Q has been shown to be valid in assessing eating disorder psychopathology in the general population (Fairburn & Beglin, 1994).

Participants completed the following self-report measures before and after the experimental interventions.

State Self Concept Clarity Scale (SSCCS; Nezlek & Plesko, 2001).

This is a 4 item questionnaire taken from the 12 item state self-concept clarity scale (Campbell et al., 1996) measuring the stability of one's sense of self. Example questions include 'My beliefs about myself often conflict with one another' and participants must rate how strongly they agree with each statement on a scale of 1 (strongly disagree) to 5 (strongly agree). The full questionnaire can be seen in Appendix D. Lower scores represent a more stable sense of self. The 4-item measure has good internal reliability and validity (Nezlek & Plesko, 2001). Cronbach's alphas calculated for each group in this study ranged from .49 to .67 (pre) and from .74 to .79 (post). A table showing the Cronbach's alpha values for all measures can be seen in Appendix E.

State Self-Esteem Scale (SSES; McFarland & Ross, 1982).

This is a 12 item questionnaire measuring explicit state self-esteem. The SSES comprises two subscales of positive and negative esteem-related words that are calculated by summing the scores for positive and negative words separately, to identify positive and negative self-esteem subscale scores. Higher scores indicate greater levels of positive or negative self-esteem. Participants rate the extent to which they feel a certain way in that moment, for example 'pride', on a scale of 1 (not at all) to 11 (extremely). The full questionnaire can be seen in Appendix F. The scale has been found to be reliable (McFarland & Ross, 1982). Cronbach's alphas calculated for each group in this study ranged from .88 to .91 (pre) and from .88 to .95 (post) for the positive subscale. Cronbach's alphas ranged from .85 to .86 (pre) and from .83 to .9 (post) for the negative subscale.

Self-Discrepancy Index (SDI; Dittmar, Beattie, & Friese, 1996).

The SDI measures actual-ideal self-discrepancies. The questionnaire developed by Dittmar et al. (1996) was adapted by Dittmar, Halliwell and Stirling (2009). Participants write up to 5 statements about themselves. They are asked to write a word or statement identifying something about themselves that they would like to change and another word or sentence that identifies how they would like to be instead. They then rate the difference between how they currently see themselves and how they would like to be on a 1 (a little) to 6 (extremely) scale followed by a rating of how concerned they are about any discrepancies using the same scale. The full questionnaire can be seen in Appendix G. The SDI has been found to be a reliable measure (Dittmar et al., 2009). Cronbach's alpha calculated for each group for SDI difference/concern scores in this study ranged from .59 to .83 (pre) and from .71 to .76 (post).

In this study an additional adaptation was made in that participants were also asked to rate how achievable they felt their ideal was, on the same scale. This data however was not included in the analyses as the Cronbach's alpha for the achievement scores ranged from .37 to .74 (pre) and from .37 to .45 (post). It was therefore deemed too unreliable to use.

Participants were able to choose whether they wrote the same or different statements post intervention. The questionnaires were then coded by the primary researcher and another researcher to determine how many participants wrote statements that were exactly the same or had the same meaning. There was 93.3% agreement between the two researchers. Where the researchers did not agree, the statements were not included in the

same statement analysis. For people who had written the same statements according to the raters, the difference and concern scores for each of the same statements were multiplied, these products were summed and then divided by the number of the same statements the participant supplied. This yielded SDI same statement scores.

For those who had not written the same statements a total SDI difference/concern score was generated from all the participants in the same way as described for the same statements, but all statements supplied were used.

Positive and Negative Affect Scales (PANAS; Watson, Clark, & Tellegen, 1988).

This is a 20 item questionnaire measuring positive and negative mood. Participants rate to what extent they feel a certain way in that moment, for example 'interested'. The emotions are rated on a scale of 1 (not at all) to 5 (extremely) and positive and negative affect scores are calculated by summing the scores for the positive and negative emotions separately. Higher scores indicate greater degrees of affect. The full questionnaire can be seen in Appendix H. The measure has good reliability and validity (Watson, Clark & Tellegen, 1988). Cronbach's alphas calculated for each group in this study ranged from .83 to .9 (pre) and from .86 to .92 (post) for the positive subscale. Cronbach's alphas ranged from .73 to .89 (pre) and from .84 to .92 (post) for the negative subscale.

Eating Disorder 15 (ED-15; Tatham et al., 2015).

This is a 15 item questionnaire measuring eating attitudes and behaviours. 10 questions assess eating and weight/shape concerns; example questions include 'over the past week I have worried about losing control over my eating' and participants must rate how often this has been the case on a scale from 0 (not at all) to 6 (all the time) to yield a total eating attitude score. The measure also includes 5 questions assessing the frequency of various behaviours such as vomiting and laxative use. The full questionnaire can be seen in Appendix I. The measure has high internal consistency and test-retest reliability (Tatham et al, 2011.). Cronbach's alphas calculated for each group in this study, ranged from .61 to .84 (pre) and from .78 to .84 (post) for the total score. Due to an error in the administration of the questionnaire, participants rated items on a scale from 0 (not at all) to 5 (most of the time) in this study rather than on the 0 to 6 (all the time) scale used in the original version.

2.2.5 Experimental tasks

Positive self-imagery (Imagery task)

The positive imagery script used by Harlowe et al. (In press) was used to help participants generate a positive image of themselves in their mind. Participants were asked to think of a time they had felt positive about themselves and once they had recalled a specific memory, they were asked if they had an image of themselves as part of the memory. If they did, they were asked to recreate that image of themselves as vividly as possible in their minds. They were then asked descriptive questions about the image and about any emotions and physical sensations the image evoked in them. They were asked to rate how vivid the image was in their mind on a scale of 0-100% (0% not all vivid, 100% most vivid). Vividness ratings for the imagery task at time 1 ranged from 60-100 (Mean = 82.5, SD = 11.03) and at time 2 ranged from 65-100 (Mean =87.9, SD = 10.5). They were also asked to rate how positive the image made them feel on a scale of 0-100% (0% not at all positive, 100% most positive). Positivity ratings at time 1 ranged from 60-100 (Mean =79.2, SD = 14.6) and at time 2 ranged from 64-100 (Mean =87.4 (SD = 9.7) A copy of the script can be seen in Appendix J. The imagery interviews were recorded for quality control purposes.

Cognitive restructuring (Verbal based task)

Participants were asked to think about a time when they had experienced a negative thought about themselves, they talked through this situation with the researcher and completed an example in the session. Using the worksheet (appendix K) participants were asked what emotions they felt during the situation and rated the strength of these emotions on a scale of 0-100% with 100% being the strongest. They were asked what negative thoughts went through their mind and which one of these thoughts was the most upsetting. Participants then had to think of facts that supported the distressing thought being true and facts that did not support it being true, before coming up with a more balanced perspective on the situation. They were then asked to re-rate their emotions.

In both tasks, adherence to the protocols was checked by one of the supervisors who listened to randomly selected imagery recordings and reviewed randomly selected thought records. Adherence to the protocols was deemed to be good, despite the variations in memories used in the images and situations used in the thought records.

2.2.6 Procedure

Participants completed the screening questionnaire online via a web-link found on the recruitment posters. The researchers scored the screening questionnaires and emailed all participants informing them whether they were eligible or not. Those that were eligible were invited to attend the experimental sessions and those that were not eligible had the option of accessing the debrief sheet with support details. Participants who arranged to attend were randomly allocated to either the imagery, verbal or control group using an internet-based computer programme (randomizer.org).

Participants attended two sessions in a laboratory at the university. In the first session all participants were given the relevant information sheet (Appendices L, M, N) and the opportunity to ask questions before signing a consent form (Appendices O, P). All participants then completed the five paper based questionnaires (SSES, SCCS, ED15, PANAS, SDI) and a demographic information sheet (Appendix Q). Participants in the experimental conditions then completed either the imagery or verbal task with the researcher and were then given instructions to practise the task once a day every day for the week. They were also emailed the same instructions every day as a reminder (Appendices R, S) and asked to complete a tick sheet to say how many days they had completed the task (Appendix T, U). The participants in the control condition completed questionnaires only. All participants returned to the laboratory on the same day the following week. Those in the intervention conditions completed the intervention again with the researcher and then completed the questionnaires. The control group simply repeated the questionnaires. All participants were then verbally debriefed and had the opportunity to ask questions. They were also given a debrief sheet (Appendix V).

2.2.7 Ethics

Ethical approval for the study was granted by the ethics committee of the University of Southampton (Appendix W).

2.2.8 Data analysis

An a priori power calculation using the on-line calculator gPower, indicated that a total sample of 48 (16 in each group) would be required to achieve a power level (1-β) of .85. The final sample in this study was 66 due to the high rate of interest in the study. A series of 3 (Group = control, verbal, imagery) x 2 (Time = pre and post) mixed ANOVAs

were used to analyse all the variables. Post hoc independent and repeated measures t-tests were used to interpret the interactions and a Bonferonni adjustment was applied.

2.3 Results

2.3.1 Data screening

Data was screened and 6 participants were excluded; 3 participants had no session 2 data and 3 participants missed out more than half of the questions on at least one of the measures. The final data set therefore included 66 participants (22 in each group).

The data was explored initially to identify any missing values. The number of missing values was minimal (there were 3 data points missing from the entire data set) and these were therefore replaced with the mean value. Mean substitution was used as most of the data was normally distributed and data was deemed to be missing at random which suggests mean substitution is a reasonable estimate for observations (Kang, 2013). The data set was also explored to identify any outliers and ensure it met the assumptions of normality and homogeneity of variance.

Histograms and calculations of skewness showed not all the data were normally distributed for each variable in each group; pre ED-15 total scores were negatively skewed in the imagery and verbal groups, pre and post ED-15 weight and shape scores were negatively skewed in the control and verbal groups, post negative PANAS scores were positively skewed in the control and imagery groups and pre and post SDI difference/concern same statement scores were negatively skewed in the control group. Boxplots also revealed various outliers which were further explored using Z-scores. Some of the Z scores were higher than 3, suggesting those data point should be considered outliers (Howell, 1998).

The data for all dependent variables was therefore transformed; after reversing the data, square root, log and reciprocal transformations were used as these can correct for negative skew (Field, 2013). The same transformations were also used without reversing the data as they can also be used for positive skew (Field, 2013). The transformations did not result in the data being normally distributed and the Z scores of the outliers were still above 3. Field (2013) reports ANOVA's to be robust to violations of normality when group sizes are equal, therefore the data was analysed using the untransformed data. Homogeneity of variance was met for all dependent variables and sphericity was met for all variables except for the SSCCS, SDI same statements and ED-15 restrict and exercise behaviours. The Greenhouse-Geisser correction was therefore used for these variables.

It must be noted that SDI same statement scores need to be interpreted with caution because the number of participants supplying the same statements pre and post was not equal in each group, and therefore tests may not be robust to the aforementioned violations.

2.3.2 Descriptive statistics

Independent t-tests showed there were no differences between the groups on global EDE-Q scores or BMI at the beginning of the experiment. Descriptive statistics were calculated for pre and post scores on all measures in the groups. This data can be seen in Table 6.

Table 6. *Descriptive scores for all measures in all groups*

	Imagery (N=22)		Verbal (N=22)		Control (N=22)	
Measure	Pre M(SD)	Post M(SD)	Pre M(SD)	Post M(SD)	Pre M(SD)	Post M(SD)
EDE-Q	3.83 (0.81)		3.72 (0.66)		3.99 (0.59)	
BMI	25.8 (5.78)		24.3 (5.83)		24.9 (6.38)	
ED-15 total	3.41 (0.78)	2.52 (0.88)	3.25 (0.79)	2.78 (0.88)	3..59 (0.61)	3.37 (0.81)
SSCCS	15.05 (2.92)	14.59 (.3.71)	14.36 (2.42)	13.68 (3.51)	14.64 (3.24)	13.86 (3.93)
SSES positive	37.77 (12.78)	48.23 (11.59)	41.36 (11.93)	45.77 (12.26)	34.36 (10.49)	34.45 (10.48)
SSES negative	27.05 (10.75)	15.95 (8.28)	24.5 (9.29)	18.41 (9.44)	25.78 (11.57)	23.23 (7.26)
PANAS positive	28.18 (8.15)	33.73 (7.57)	28.09 (7.82)	32.05 (8.35)	28.91 (7.48)	28.23 (7.26)
PANAS negative	22.27 (9.08)	16.5 (8.15)	18.64 (5.67)	17.18 (6.21)	21.18 (7.69)	20 (7.53)
SDI total	87.85 (28.76)	74.13 (30.31)	61.04 (29.95)	62.65 (29.95)	92.39 (29.14)	85.94 (29.84)
	(N=16)		(N=15)		(N=20)	
SDI same statement	23.28 (7.51)	18.83 (6.56)	16.53 (8.47)	17.49 (8.28)	28.07 (15.01)	27.39 (19.98)

2.3.3 Self-concept measures

Positive state self-esteem

There were main effects of time, $F(1,63) = 20.23$, $p < .001$, $\eta_p^2 = .243$ and of group, $F(2,63) = 5.05$, $p = .009$, $\eta_p^2 = .138$. There was also a significant interaction effect of time x group on positive state self-esteem, $F(2,63) = 7.36$, $p = .001$, $\eta_p^2 = .189$. Figure 4 shows the changes in each of the groups.

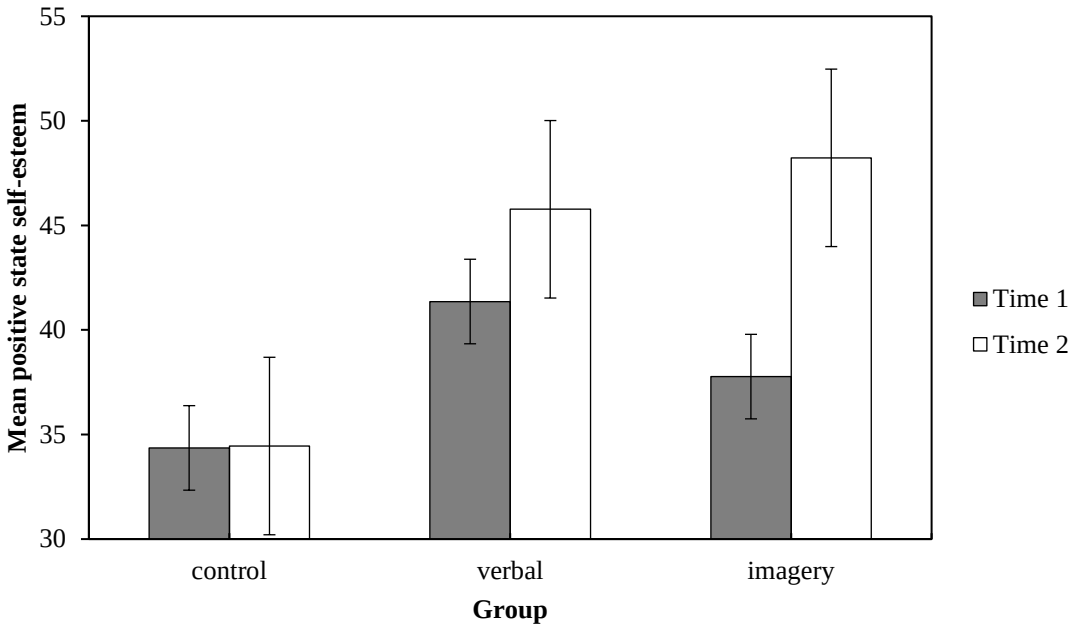


Figure 4. Graph showing pre and post positive state self-esteem in all groups

Using a Bonferonni corrected *p* value of .013, post hoc paired sample t-tests revealed that positive state self-esteem had significantly increased at time 2 in the imagery group, $t(21) = -5.63$, $p < .001$, but not in the verbal group $t(21) = -2.14$, $p = .045$. Independent sample t-tests revealed that both of the experimental groups reported higher positive state self-esteem after the interventions than the control group (imagery versus control, $t(42) = -4.14$, $p < .001$, verbal versus control, $t(42) = -3.29$, $p = .002$).

Negative state self-esteem.

There was a main effect of time, $F(1,63) = 40.75$, $p = <.001$, $\eta_p^2 = .393$, but no main effect of group, $F(2,63) = .758$, $p = .47$, $\eta_p^2 = .023$. However, there was a significant time x group interaction for negative state self-esteem, $F(2,63) = 5.96$, $p = .004$, $\eta_p^2 = .159$. Figure 5 shows the change in each of the groups.

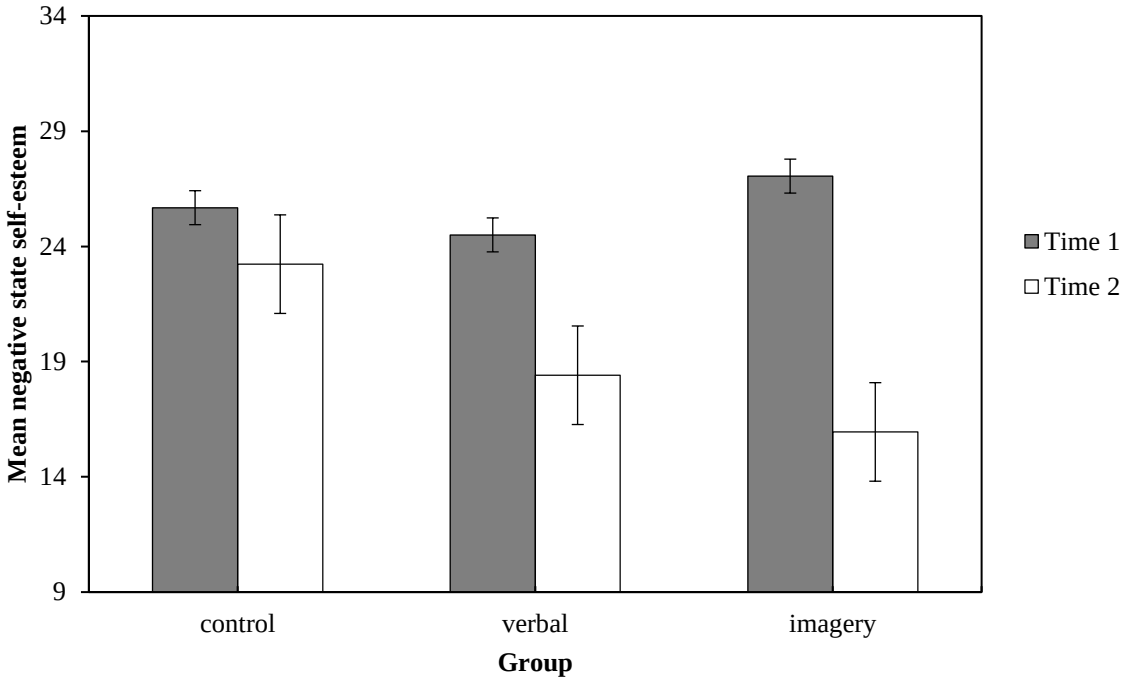


Figure 5. Graph showing pre and post negative state self-esteem in all groups

Using a Bonferonni corrected *p* value of .013, post hoc paired sample t-tests revealed that negative state self-esteem had significantly decreased at time 2 in both the imagery group, $t(21) = 5.61$, $p < .001$, and in the verbal group, $t(21) = 3.15$, $p = .005$. However, independent sample t-tests showed that there were no differences between the intervention groups and the control groups at time 2 (imagery versus control, $t(42) = 2.45$, $p = .02$, verbal versus control, $t(42) = 1.54$, $p = .13$).

Using the stringent Bonferonni criteria, the difference between imagery and control groups just failed to meet significance; by comparison the differences between verbal/control were not approaching significance.

Self-discrepancies

SDI total difference/concern. There was a significant main effect of group, $F(2,63) = 6.13$, $p = .004$, $\eta_p^2 = .163$, but no main effect of time, $F(1,63) = 3.12$, $p = .08$, $\eta_p^2 = .047$, and no interaction, $F(2,63) = 1.6$, $p = .21$, $\eta_p^2 = .048$. Post hoc tests revealed that SDI total scores were lower in the verbal group compared to the control group, $p = .003$. There were no differences between the other groups (imagery versus control, $p = .94$, imagery versus verbal, $p = .06$).

SDI same statement difference/concern. There was a significant main effect of group, $F(2,48) = 3.62$, $p = .03$, $\eta_p^2 = .131$, but no main effect of time, $F(1,48) = 1.41$, $p = .24$, $\eta_p^2 = .028$ and no interaction effect, $F(2,48) = 1.76$, $p = .18$, $\eta_p^2 = .068$. Post hoc tests revealed that SDI same statement scores were lower in the verbal group compared to the control group, $p = .03$. There were no differences between the other groups (imagery versus control, $p = .31$, imagery versus verbal, $p = .1$).

State self-concept clarity

There were no main effects of time, $F(1,63) = 3.33$, $p = .07$, $\eta_p^2 = .05$ or group, $F(2,63) = .407$, $p = .67$, $\eta_p^2 = .013$, and no interactions, $F(2,63) = .074$, $p = .93$, $\eta_p^2 = .002$ for the self-concept clarity scale.

Summary of the impact on self variables

These results indicate that positive self-imagery increased positive state self-esteem and reduced negative state self-esteem. Cognitive restructuring reduced negative state self-esteem but had no effect on positive state self-esteem. Self-discrepancies did not change over time but the verbal group reported overall lower discrepancies than controls whereas the imagery group did not. There were no effects in any of the groups on self-concept clarity.

2.3.4 Affect measures

Positive affect

Results revealed a main effect of time, $F(1,63) = 11.56$, $p = .001$, $\eta_p^2 = .155$, but no main effect of group, $F(2,63) = .664$, $p = .52$, $\eta_p^2 = .021$. Results revealed a significant interaction effect of time x group on positive affect, $F(2,63) = 4.67$, $p = .01$, $\eta_p^2 = .129$. Figure 6 shows the changes in each of the groups.

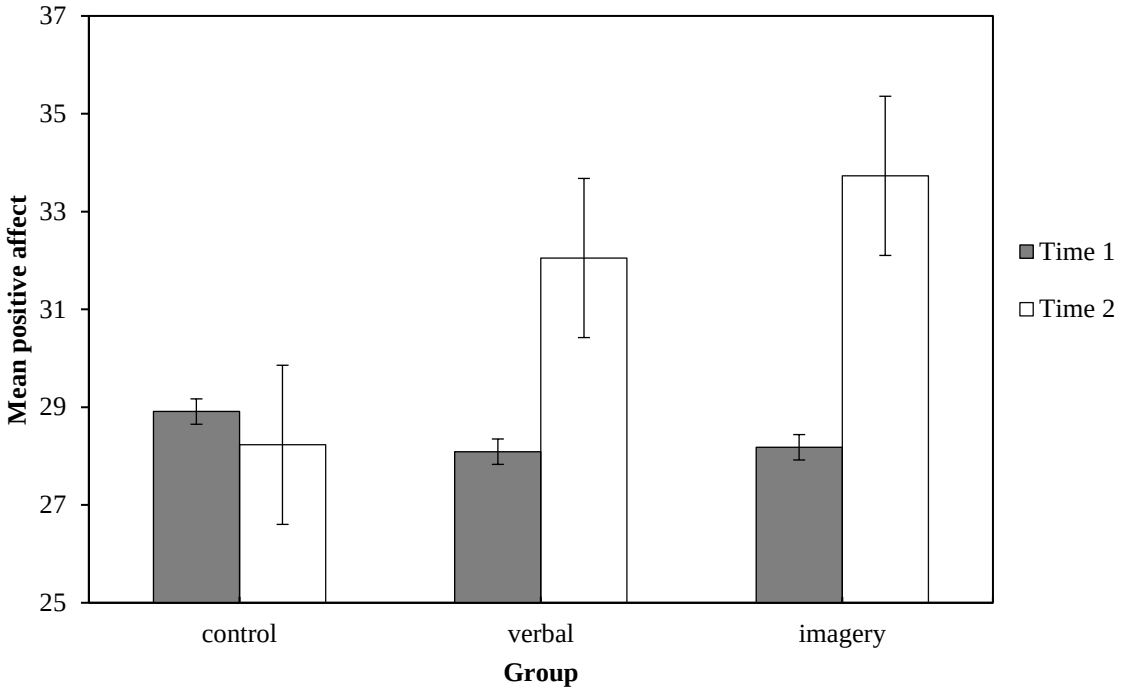


Figure 6. Graph showing pre and post positive affect in all groups

Using a Bonferonni corrected *p* value of .01, post hoc paired sample t-tests revealed that positive affect had significantly increased at time 2 in the imagery group, $t(21) = -3.3$, $p = .003$, but not in the verbal group, $t(21) = -2.49$, $p = .021$. Independent sample t-tests revealed that positive affect was not significantly higher in either the imagery or verbal groups than those in the control group at time 2 (imagery versus control, $t(42) = -2.46$, $p = .02$, verbal versus control, $t(42) = -1.62$, $p = .113$) at time 2. There were also no differences between the imagery and verbal groups, $t(42) = -.7$, $p = .49$.

Again, the stringent Bonferonni criteria meant the difference between imagery and control groups just failed to meet significance whereas the differences between verbal/control and verbal/imagery were not approaching significance.

Negative affect

Negative affect. Results revealed a main effect of time, $F(1,63) = 14.69$, $p < .001$, $\eta_p^2 = .189$, but no main effect of group, $F(2,63) = .843$, $p = .44$, $\eta_p^2 = .026$. Results revealed a significant interaction effect of time x group on negative affect, $F(2,63) = 4.13$, $p = .02$, $\eta_p^2 = .116$. Figure 7 shows the changes in each of the groups.

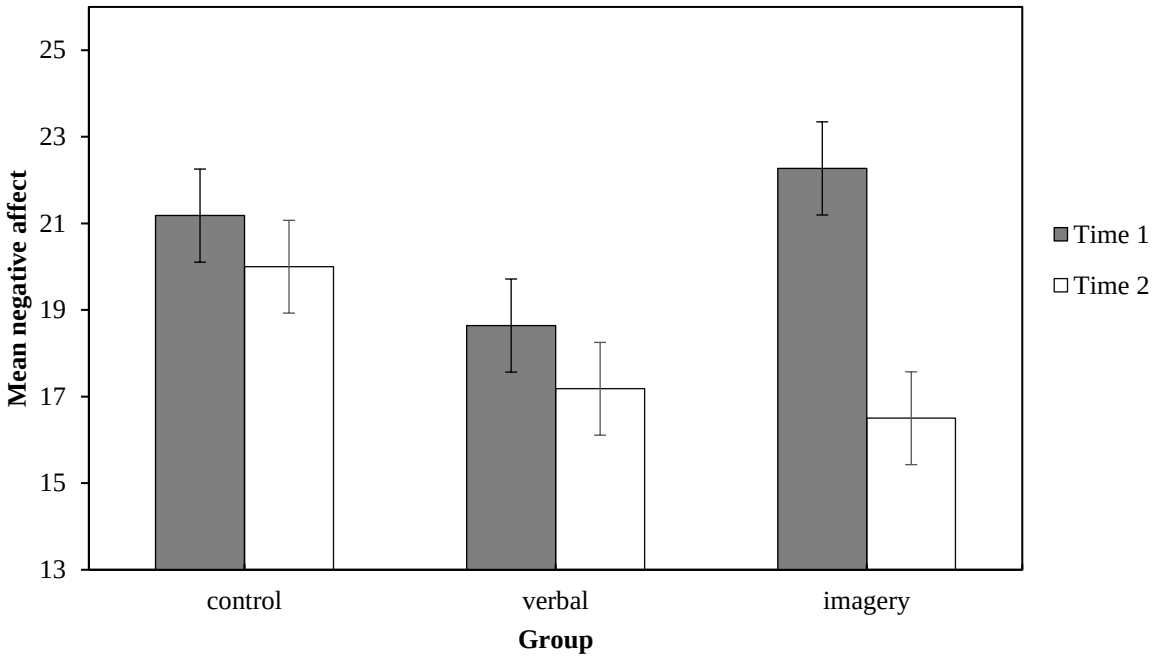


Figure 7. Graph showing pre and post negative affect in all groups

Using a Bonferonni corrected *p* value of .013, post hoc paired sample t-tests revealed that negative affect had significantly decreased at time 2 in the imagery group, $t(21) = 4.55$, $p < .001$, but not in the verbal group, $t(21) = 1.43$, $p = .17$. Independent sample t-tests revealed that negative affect was not significantly lower in either the imagery or verbal groups than those in the control group at time 2 (imagery versus control, $t(42) = 1.48$, $p = .15$, verbal versus control, $t(42) = 1.36$, $p = .18$).

Summary of the impact on affect

These results indicate that positive self-imagery increased positive affect and reduced negative affect but cognitive restructuring had no effect.

2.3.5 Eating measures

Eating attitudes

There was a main effect of time, $F(1,63) = 38.17$, $p < .001$, $\eta_p^2 = .377$ and a main effect of group, $F(2,63) = 3.49$, $p = .04$, $\eta_p^2 = .1$. There was also a significant interaction effect of time x group on eating attitudes, $F(2,63) = 5.23$, $p = .008$, $\eta_p^2 = .142$. Figure 8 shows the changes in each of the groups.

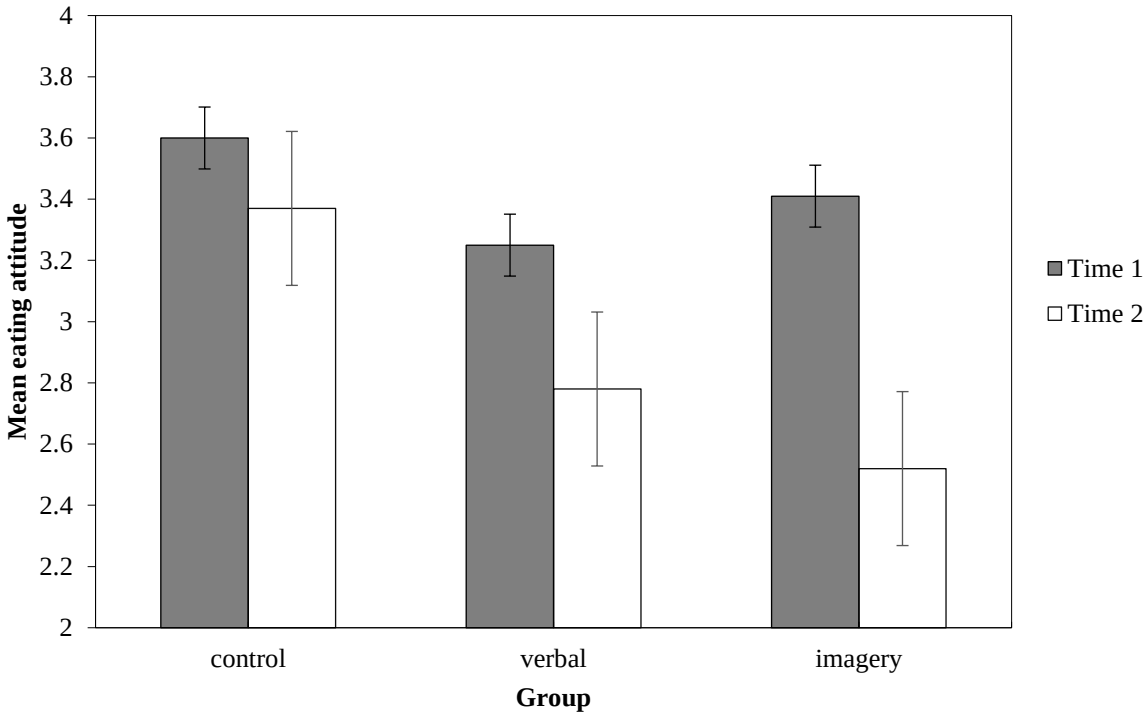


Figure 8. Graph showing pre and post eating attitudes in all groups

Using a Bonferonni corrected *p* value of .01, post hoc paired sample t-tests revealed that eating attitudes had significantly decreased at time 2 in both the imagery, $t(21) = 4.9$, $p < .001$, and verbal groups, $t(21) = 3.08$, $p = .006$. Independent sample t-tests revealed that eating attitudes were significantly lower at time 2 in the imagery group compared to the control group (imagery versus control, $t(42) = 3.33$, $p = .002$) but there were no differences between the verbal and control groups at time 2 (verbal versus control, $t(42) = 2.34$, $p = .02$), however this was approaching significance. There was also no difference between the imagery and verbal groups at time 2, $t(42) = .96$, $p = .34$.

Eating behaviours

Frequency data was collected for eating disorder behaviours on the ED15. The mean number of times per week that each behaviour was used can be seen in Table 7.

Table 7. *Means and standard deviations of behaviour frequency per week*

	Imagery (N=12)		Verbal (N=12)		Control (N=17)	
Behaviour	Pre *M(SD)*	Post *M(SD)*	Pre *M(SD)*	Post *M(SD)*	Pre *M(SD)*	Post *M(SD)*
Binge	2.17 (1.4)	0.83 (0.84)	1.42 (1.17)	1 (0.85)	2.59 (1.67)	2 (1.5)
	Imagery (N=8)		Verbal (N=7)		Control (N=7)	
Vomit	1 (2.24)	0 (0)	0 (0)	0.14 (0.38)	0.75 (1.17)	0.5 (0.54)
	Imagery (N=8)		Verbal (N=7)		Control (N=9)	
Laxative	0.25 (0.46)	0.13 (0.35)	0 (0)	0 (0)	0.67 (1.41)	0.78 (1.2)
	Imagery (N=16)		Verbal (N=17)		Control (N=21)	
Restrict	5.44 (4.52)	2.44 (2.28)	3.71 (2.29)	3.18 (2.1)	3.76 (2.57)	3.71 (2.28)
	Imagery (N=17)		Verbal (N=12)		Control (N=13)	
Exercise	3.82 (7.12)	2.35 (2.32)	2.58 (2.43)	2.67 (2.15)	2.77 (2.39)	2.69 (2.06)

There were unequal sample sizes due to some participants reporting n/a (never done the behaviour) who were not included in the following ANOVA's. ANOVAs were conducted on the binge, restrict and exercise scores. They were not conducted on the vomit and laxative scores as the frequency data was so low that there were likely to be floor effects.

Bingeing. There was a main effect of time, $F(1,38) = 14.93$, $p <. 001$, $\eta_p^2 = .282$, and a main effect of group, $F(2,38) = 3.48$, $p = .04$, $\eta_p^2 = .155$. There was no time x group interaction, $F(2,38) = 1.81$, $p = .18$, $\eta_p^2 = .087$. Bingeing reduced in all groups at time 2. Post hoc tests revealed the groups did not differ from each other (imagery versus control, $p = .23$, verbal versus control, $p = 05$, imagery versus verbal, $p = 1$).

Restricting. Results revealed a main effect of time, $F(1,51) = 8.92$, $p =. 004$, $\eta_p^2 = .149$, but no main effect of group, $F(2,51) = .19$, $p = .83$, $\eta_p^2 = .007$. Results revealed a significant interaction effect of time x group on restricting, $F(2,51) = 5.09$, $p = .01$, $\eta_p^2 = .166$. Figure 9 shows the changes in each of the groups.

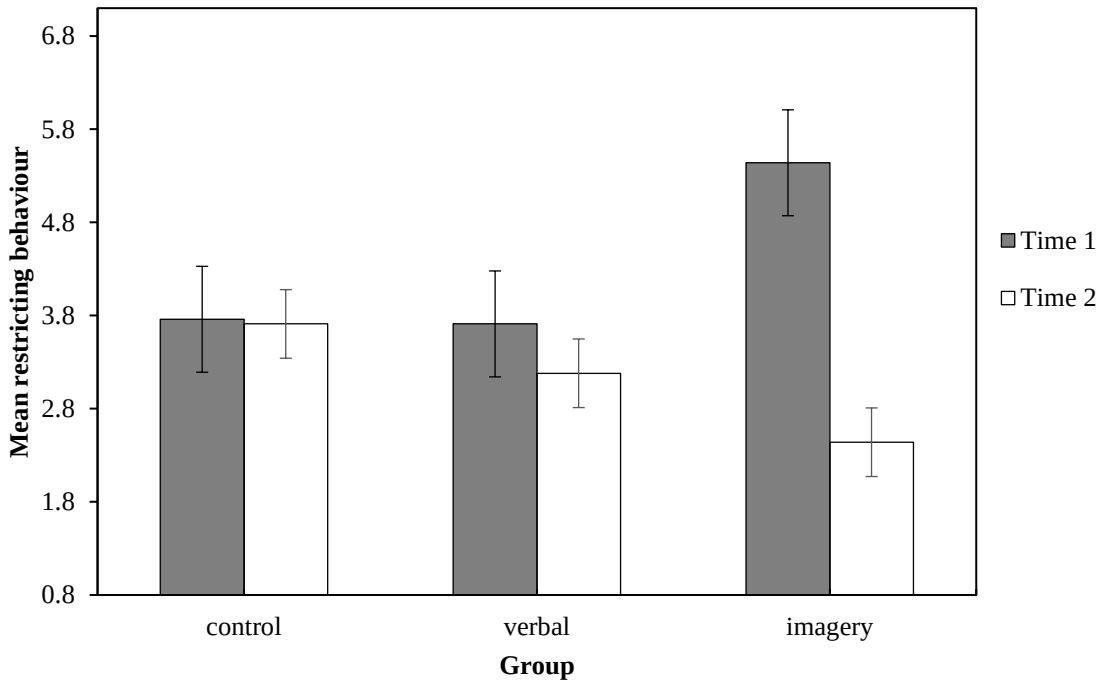


Figure 9. Graph showing pre and post restricting behaviour in all groups

Using a Bonferonni corrected *p* value of .02, post hoc paired sample t-tests revealed that restricting behaviour had significantly decreased at time 2 in the imagery group, $t(21) = .2.9$, $p = .007$. Independent sample t-tests revealed that restricting was significantly lower

at time 2 in the imagery group compared to the control group, imagery versus control, $t(42) = 2.56$, $p = .01$. However there were no differences between the imagery and verbal groups, $t(42) = 1$, $p = .32$).

Exercise. Results revealed no main effect of time, $F(1,39) = .45$, $p = .51$, $\eta_p^2 = .011$, no main effect of group, $F(2,39) = .097$, $p = .91$, $\eta_p^2 = .005$ and no interaction effect of time x group, $F(2,39) = .507$, $p = .61$, $\eta_p^2 = .025$.

Summary of impact on eating habits

These results show that both positive self-imagery and cognitive restructuring reduced disordered eating attitudes and bingeing behaviours but one was not more effective than the other. Restricting behaviours had reduced after positive self-imagery but not after cognitive restructuring. There was no effect on exercising behaviours.

2.4 Discussion

The primary aim of this study was to explore the effectiveness of a positive self-imagery intervention on aspects of the self-concept, mood and eating habits in a sample of people with high levels of eating disorder cognitions. The secondary aim was to compare the effectiveness of the imagery intervention with a verbal intervention. Thus far, no previous studies have directly compared imagery and verbal interventions in the eating disorders. The findings, as well as the strengths and limitations of the study, its clinical implications and directions for future research are discussed below.

2.4.1 Summary of findings

This study identified that both the imagery and verbal interventions had a positive impact on some of the self variables, on affect, and on elements of eating. In line with the hypotheses, both interventions reduced negative state self-esteem, disordered eating attitudes and bingeing behaviours. Only the imagery intervention increased positive state self-esteem, increased positive affect, reduced negative affect and reduced restricting behaviours. Neither of the interventions had any effect on self-concept clarity or self-discrepancies over time.

The interventions had different effects compared to the control group on some of the outcomes; for positive state self-esteem both intervention groups reported higher scores than the control group, post intervention. For total self-discrepancies and same statement self-discrepancies, only the verbal group reported lower overall scores than the control group. For eating attitudes and restricting behaviour, only the imagery group reported lower scores than the control group, post intervention. There were no differences between any of the groups after the interventions for positive and negative affect, negative state self-esteem or bingeing behaviours. However, the difference between the imagery and control groups for positive affect and negative state self-esteem was approaching significance. There were also no differences between the imagery and verbal groups on any of the aspects measured, post intervention.

These findings are in line to an extent with the hypotheses and also with previous studies demonstrating imagery interventions can effectively improve aspects of the self. For example, the improvement in positive state self-esteem and reduction in negative state

self-esteem is in line with the studies by Farrar et al. (2015) and Harlowe et al. (In press). The findings also fit with previous imagery intervention studies that found reductions in negative core belief ratings after imagery rescripting (e.g Ohanian, 2002; Cooper & Turner, 2007, Cooper, 2011). Although core belief ratings were not directly tested in the current study, given that beliefs about the self make up one's explicit self-esteem (Greenwald & Farnham, 2000) one would hypothesize that if self-esteem has improved, core belief ratings are also likely to have improved.

The lack of significant findings for self-discrepancies however, was not in line with the hypotheses. Given that individuals with eating disorders often have actual-ideal self-discrepancies (Bers, Blatt & Dolinsky, 2004) and that lower self-esteem is associated with larger actual-ideal self-discrepancies (Higgins, 1989) it follows that improving self-esteem by either of the interventions in the study would reduce the discrepancies; however, this was not the case. This was also in contrast to Harlowe et al. (In press) who found that self-discrepancies did reduce after a single session of positive image retrieval. The method of administration for the SDI in this study may have contributed to this inconsistent finding. For the participants who did not rate the same statements pre and post intervention, the ratings were not directly comparable. For the participants who did write the exact same, the sample was too small to analyse. For those who wrote very similar statements as judged by the researchers, although the agreement between the raters was high, this may not have meant participants thought of them as the same meaning and therefore scores may not have represented how they felt about the same discrepancy pre and post.

The absence of any effects of the two interventions on self-concept clarity was also not in line with the hypotheses. It has been suggested that the experience of self-discrepancy is likely to cause a sense of uncertainty about the self which may then lead to reduced self-concept clarity (Stopa, Brown & Hirsch, 2011) and that retrieving a positive image reduces the discrepancy between the ideal and actual self (Farrar et al., 2015; Harlowe et al., In press). Stopa, Brown and Hirsch (2012) however, suggest that different aspects of the self may change at different rates and it could be that the self-discrepancy experienced by people with high levels of eating disorder cognitions is longstanding and will take longer to change than some of the other aspects measured. Furthermore, the measure used only contained four statements and is perhaps not sensitive enough to capture any change over the course of a week.

The findings that bingeing and restricting behaviours reduced after the imagery intervention is in line with previous studies showing imagery interventions can improve

eating pathology. For example, Esplen et al. (1998) found that a guided imagery intervention where participants with BN were guided through images of scenes that promoted relaxation and images of the self through metaphorical descriptions such as viewing oneself as a colour, reduced bingeing and purging frequencies. Furthermore, Schmidt and Martin (2016) found that asking participants with regular subjective bingeing episodes to think of a relaxing and pleasant image reduced subjective binge episodes.

Esplen et al. (1998) suggest that guided imagery can serve both as a relaxation technique and provides a technique for individuals to self-soothe. Given that individuals with disordered eating can use behaviours such as bingeing and restricting to modulate negative affect and self-soothe (Bruch, 1973), it is possible that using an imagery technique such as the positive self-imagery in this study can provide a means for self-soothing and modulating negative affect instead of the eating disordered behaviours.

The effects of the imagery intervention on affect are in line with the hypotheses and with previous studies (Farrar et al. 2015; Harlowe et al. In press). Given that self-esteem, self-concept clarity and self-discrepancies are related to affect (Baumgardner, 1990; Cockerham et al., 2009; Higgins, 1987; McDaniel & Grice, 2008) it fits that improvements in some aspects of the self would lead to improvements in affect. The non-significant finding for the verbal group therefore was unexpected.

Cognitive restructuring is successful at improving mood, for example in people with depression (Forman, Herbert, Moitra, Yeomans & Geller, 2007) and therefore was expected to improve mood in this study. The absence of a significant finding however, may in part be related to the use of the Bonferonni correction, as without this adjustment, positive affect had significantly increased in the verbal group. Bonferonni states quite a stringent criteria and the results must therefore be interpreted with caution as we cannot rule out the chance of a Type II error through the use of Bonferonni. Conversely, the non-significant finding may be due to the fact that cognitive restructuring would typically be used as and when someone noticed a negative thought; however, in this study, people were having to purposely think of a negative thought, which they may not have otherwise noticed. Bringing a negative thought to mind may have led to more negative affect than someone would have routinely been feeling; a number of participants commented on this in the debrief saying they had found it hard to notice thoughts and noticed they felt worse once they had purposely thought of a negative thought.

Finally, the results support the existing literature showing verbal interventions such as cognitive restructuring are effective at improving self-esteem (Newns et al., 2003).

However, there were some areas, such as eating cognitions and restricting behaviour, where the imagery group was more successful than the verbal group, when compared to the control group. In other areas, such as positive affect and negative state self-esteem, the imagery group compared to the control group just failed to reach significance due to the use of the stringent Bonferonni criteria, whereas this was not the case with the verbal compared to control groups, suggesting that perhaps imagery may also be more successful in these areas.

2.4.2 Strengths of study

The study adds to the small body of literature exploring the effects of imagery interventions in clinical and non-clinical eating disorder samples. It is also the first study to compare an imagery intervention with a more traditional verbal thought challenging technique. The fact the study had a control group and used random allocation to groups were strengths, as to date, studies examining the effects of imagery interventions have lacked a control group and have not used random allocation (eg Shapiro et al., 2008; Schmidt & Martin,. 2016). The design of the study with the participants being taught the tasks and then practising them for a week is similar to how an intervention would be used in a clinical setting, giving the study ecological validity.

Furthermore, the EDE-Q scores of the sample were similar to those found in studies using clinical populations, for example in a treatment seeking sample for a CBT intervention, Waller et al. (2018) reported the mean EDE-Q scores were 3.98 and 4.06 at two sites compared to the mean scores in the groups in this study (3.83, 3.72, 3.99). This demonstrates the population in this study was a robust analogue sample and it is likely the results could be replicated in a clinical population. Furthermore, the fact that people volunteered for the study may mean they are representative of people with eating disorders who want to recover or change. Conversely, there are also several limitations of the study which must be considered.

2.4.3 Limitations of study

The recruitment process is likely to have led to some sampling bias given that all the participants volunteered for the study and were paid or given credits towards their course for taking part. On the one hand, this may have contributed to the high level of eating difficulties observed in the sample making it a robust representation of a clinical

population. On the other hand, participants driven by the reward for the study may not have completed the tasks in between the sessions as thoroughly as they might if they were patients with an eating disorder who were motivated to change. Therefore the effects may have been minimised if participants did not practise the tasks as often as they might if they were in treatment for an eating disorder. Although the study attempted to measure the adherence of participants completing the tasks each day by giving them the tick sheet to complete, this was self-report and therefore vulnerable to misinformation. Furthermore, the sample was also predominantly White British undergraduate students and therefore the findings cannot be generalised to other groups of people.

All of the data relied on self-report and the questionnaires were completed with the researcher in the room. Although the researcher could not see what the participant was writing, the participant may still have felt shame and minimised answers. Self-report data also has limited reliability and some concepts are difficult to assess accurately, particularly in the field of eating disorders, for example every participant knowing exactly what constitutes a binge (Fairburn & Wilson, 1993).

A further methodological flaw concerning two of the questionnaires must also be considered. Not all participants rated the same actual-ideal self-discrepancies pre and post which made it difficult to compare specific actual-ideal differences pre and post. If there had been a larger number of participants to compare the scores on the same statements, this may have shown different results. Furthermore, the error in administration of the ED15 may have affected the results as data was potentially lost from participants who would have rated a 6. This meant there was a smaller range for participants to change within, potentially making it less likely to capture a significant change.

There was no data collected on whether participants had received previous treatment for any mental health problems. Some participants commented that they were familiar with the verbal exercise from doing CBT previously which may have influenced results if people had already had experience of using this technique. For example, they may have found it helpful and already have been doing it regularly or they may not have found it helpful and therefore were less likely to practise it during the week. If this had been measured it could have been explored as a potential co-variate. Furthermore data was only collected pre and post interventions with no follow-up, so it is not known whether the effects of the interventions hold over time. This would be a useful avenue to explore in future studies.

In addition to participants potentially having had experience of the verbal intervention before, a further limitation must be noted in terms of the differences between the two intervention tasks. The imagery intervention was priming a positive emotion whereas the verbal intervention was initially priming a negative emotion by asking people to think of a negative thought. This may have meant participants' affect in the verbal group initially dropped when they started doing the task. If this were the case, their affect scores would have likely needed to increase more than affect scores in the imagery group to show the same change, as the imagery group wouldn't necessarily have had the initial drop in mood.

In future studies it may be useful to compare the imagery intervention with a positive verbal intervention to control for this; for example, a more evenly matched verbal based intervention could be asking participants to complete a positive log of writing three positive things about themselves each day.

2.4.4 Clinical implications and future research

The results of this study have shown that imagery can be as effective as cognitive restructuring in tackling aspects of the self, affect and eating pathology in people with high levels of eating disorder cognitions, which suggests imagery is a useful technique to consider in eating disorder treatments. The results also tentatively suggest that imagery may be more effective than cognitive restructuring in tackling some aspects of the self and eating pathology. Brewin (2006) suggests cognitive therapy helps people to access positive representations of the self which reduces access to negative self-representations, thus reducing the discrepancy between the ideal and actual self. The findings of this study suggest imagery is one way to access positive representations of the self and incorporating them into eating disorder treatments could help to challenge the negative views of the self that people with eating disorders often hold (Cooper et al., 2004).

The results also suggest potential developments that could be incorporated into the transdiagnostic model of eating disorders. Given that the study supports the hypothesis that images may represent the self, this suggests the model could benefit from a broader conceptualisation of the role of the self in eating disorders, perhaps to include negative self-imagery as a possible maintaining mechanism.

To further develop the model, future research would benefit from replicating the study in a clinical sample, as well as including a follow up point to ascertain whether the effects of the interventions hold over time. It would also be useful to ascertain whether the effectiveness of the imagery intervention is affected by the type of eating disorder someone presents with; thus far research exploring imagery interventions in clinical populations has mainly been with people with BN (e.g Ohanian, 2002; Cooper et al., 2007 and it would be helpful to explore whether the effects exist in other eating disorders. Furthermore, the inclusion of a positive self-imagery intervention may complement other imagery based techniques that have been found to be effective in the treatment of eating disorders, such as imagery rescripting for the modification of core beliefs in BN.

Furthermore, the inclusion of imagery techniques could be useful for certain subsets of people. For example if clients were not finding cognitive restructuring effective, or finding it difficult to engage with, positive self-imagery could be considered as an alternative clinical tool. This may be helpful in people who think in more visual ways or for people who might struggle with word based interventions, for example people with dyslexia. It may be useful in future studies to include a measure of the way people think, for example by using the Visualizer-Verbalizer Questionnaire (Richardson, 1977) which assesses an individual's preference for visual or verbal learning. Using something like this could determine whether people think more in visual images or words which could help to understand whether an individual's learning preference (verbal or visual) affects which intervention is more effective for them. It would also be useful to perhaps record the imagery intervention instructions so people could use them to guide them through the exercises as this may improve adherence. Future studies could then also explore whether this improves outcomes.

2.4.5 Conclusions

This study is the first study to compare an imagery intervention with a verbal intervention in people with high levels of eating disorder cognitions. Both the imagery and verbal interventions improved self-esteem and eating pathology; imagery was more effective than the verbal intervention when compared with the control group in targeting eating cognitions and restricting behaviour but there were no significant differences between the imagery and verbal groups when compared to each other. Neither intervention affected self-concept clarity or self-discrepancies over time.

The study adds to existing literature demonstrating imagery can target aspects of the self and eating pathology and also adds to the existing literature demonstrating cognitive restructuring as an effective part of eating disorder treatment. The results suggest incorporating imagery techniques into eating disorder treatments could be beneficial and future research should explore the clinical utility of the intervention in a clinical population and include follow up time points. The study provides promising results to build on in the emerging area of imagery in the eating disorders.

Appendix A Quality Assessment Tool for Quantitative Studies

QUALITY ASSESSMENT TOOL FOR QUANTITATIVE STUDIES

COMPONENT RATINGS

A) SELECTION BIAS

(Q1) Are the individuals selected to participate in the study likely to be representative of the target population?

1 Very likely
2 Somewhat likely
3 Not likely
4 Can't tell

(Q2) What percentage of selected individuals agreed to participate?

1 80 - 100% agreement
2 60 – 79% agreement
3 less than 60% agreement
4 Not applicable
5 Can't tell

RATE THIS SECTION	STRONG	MODERATE	WEAK
See dictionary	1	2	3

B) STUDY DESIGN

Indicate the study design

1 Randomized controlled trial
2 Controlled clinical trial
3 Cohort analytic (two group pre + post)
4 Case-control
5 Cohort (one group pre + post (before and after))
6 Interrupted time series
7 Other specify _____
8 Can't tell

Was the study described as randomized? If NO, go to Component C.

No Yes

If Yes, was the method of randomization described? (See dictionary)

No Yes

If Yes, was the method appropriate? (See dictionary)

No Yes

RATE THIS SECTION	STRONG	MODERATE	WEAK
See dictionary	1	2	3

Appendix A

C) CONFOUNDERS

(Q1) Were there important differences between groups prior to the intervention?

1 Yes
2 No
3 Can't tell

The following are examples of confounders:

1 Race
2 Sex
3 Marital status/family
4 Age
5 SES (income or class)
6 Education
7 Health status
8 Pre-intervention score on outcome measure

(Q2) If yes, indicate the percentage of relevant confounders that were controlled (either in the design (e.g. stratification, matching) or analysis)?

1 80 – 100% (most)
2 60 – 79% (some)
3 Less than 60% (few or none)
4 Can't Tell

RATE THIS SECTION	STRONG	MODERATE	WEAK
See dictionary	1	2	3

D) BLINDING

(Q1) Was (were) the outcome assessor(s) aware of the intervention or exposure status of participants?

1 Yes
2 No
3 Can't tell

(Q2) Were the study participants aware of the research question?

1 Yes
2 No
3 Can't tell

RATE THIS SECTION	STRONG	MODERATE	WEAK
See dictionary	1	2	3

E) DATA COLLECTION METHODS

(Q1) Were data collection tools shown to be valid?

1 Yes
2 No
3 Can't tell

(Q2) Were data collection tools shown to be reliable?

1 Yes
2 No
3 Can't tell

RATE THIS SECTION	STRONG	MODERATE	WEAK
See dictionary	1	2	3

F) WITHDRAWALS AND DROP-OUTS

(Q1) Were withdrawals and drop-outs reported in terms of numbers and/or reasons per group?

1 Yes
2 No
3 Can't tell
4 Not Applicable (i.e. one time surveys or interviews)

(Q2) Indicate the percentage of participants completing the study. (If the percentage differs by groups, record the lowest).

1 80 -100%
2 60 - 79%
3 less than 60%
4 Can't tell
5 Not Applicable (i.e. Retrospective case-control)

RATE THIS SECTION	STRONG	MODERATE	WEAK	
See dictionary	1	2	3	Not Applicable

G) INTERVENTION INTEGRITY

(Q1) What percentage of participants received the allocated intervention or exposure of interest?

1 80 -100%
2 60 - 79%
3 less than 60%
4 Can't tell

(Q2) Was the consistency of the intervention measured?

1 Yes
2 No
3 Can't tell

(Q3) Is it likely that subjects received an unintended intervention (contamination or co-intervention) that may influence the results?

4 Yes
5 No
6 Can't tell

H) ANALYSES

(Q1) Indicate the unit of allocation (circle one)

community organization/institution practice/office individual

(Q2) Indicate the unit of analysis (circle one)

community organization/institution practice/office individual

(Q3) Are the statistical methods appropriate for the study design?

1 Yes
2 No
3 Can't tell

(Q4) Is the analysis performed by intervention allocation status (i.e. intention to treat) rather than the actual intervention received?

1 Yes
2 No
3 Can't tell

Appendix A

GLOBAL RATING

COMPONENT RATINGS

Please transcribe the information from the gray boxes on pages 1-4 onto this page. See dictionary on how to rate this section.

A	**SELECTION BIAS**	**STRONG**	**MODERATE**	**WEAK**	
		1	2	3	
B	**STUDY DESIGN**	**STRONG**	**MODERATE**	**WEAK**	
		1	2	3	
C	**CONFOUNDERS**	**STRONG**	**MODERATE**	**WEAK**	
		1	2	3	
D	**BLINDING**	**STRONG**	**MODERATE**	**WEAK**	
		1	2	3	
E	**DATA COLLECTION METHOD**	**STRONG**	**MODERATE**	**WEAK**	
		1	2	3	
F	**WITHDRAWALS AND DROPOUTS**	**STRONG**	**MODERATE**	**WEAK**	
		1	2	3	Not Applicable

GLOBAL RATING FOR THIS PAPER (circle one):

1	STRONG	(no WEAK ratings)
2	MODERATE	(one WEAK rating)
3	WEAK	(two or more WEAK ratings)

With both reviewers discussing the ratings:

Is there a discrepancy between the two reviewers with respect to the component (A-F) ratings?

No Yes

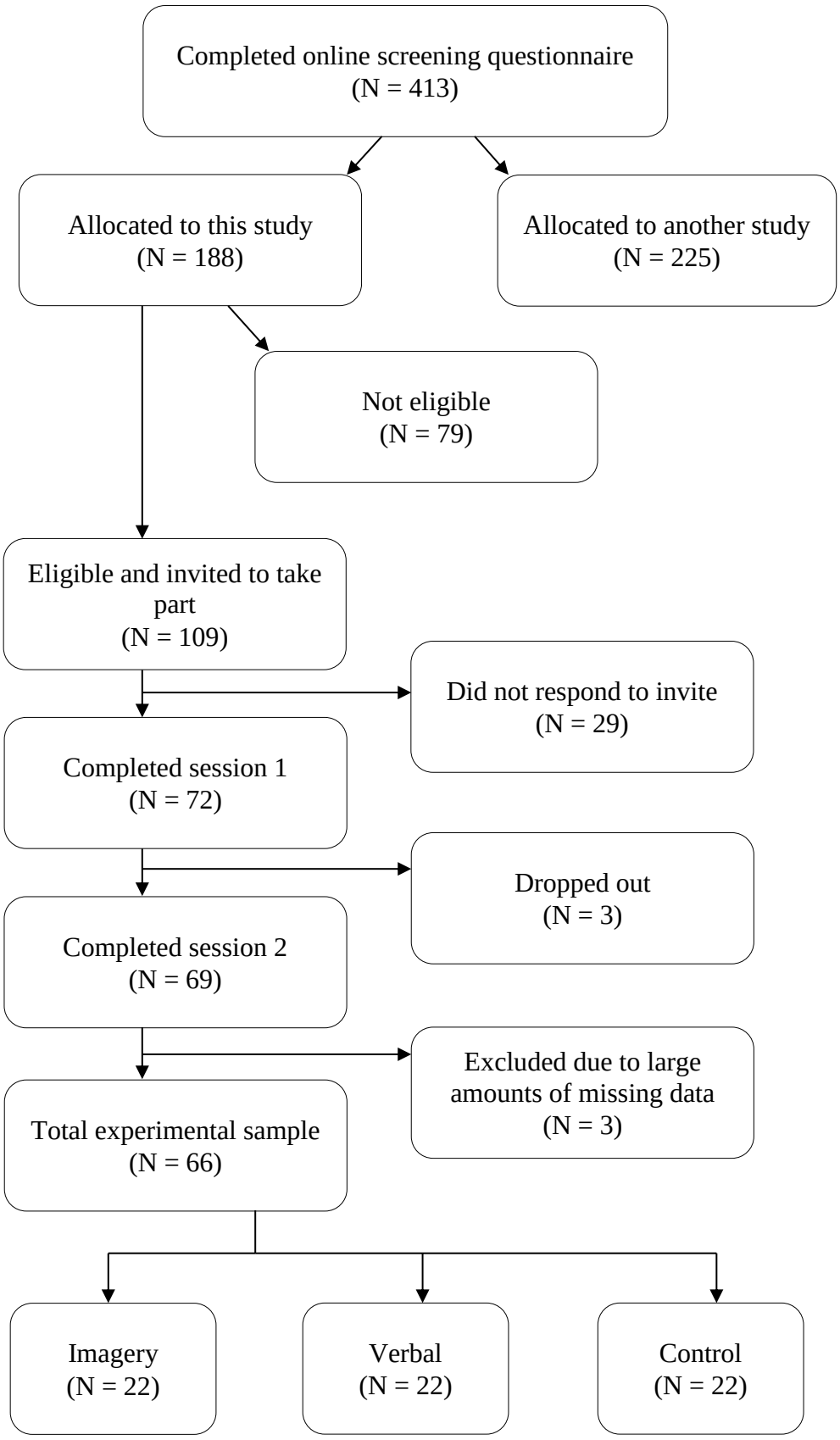
If yes, indicate the reason for the discrepancy

1	Oversight
2	Differences in interpretation of criteria
3	Differences in interpretation of study

Final decision of both reviewers (circle one):

1	**STRONG**
2	**MODERATE**
3	**WEAK**

Appendix B Flowchart of recruitment process for empirical study



Appendix C Study Advert

UNIVERSITY OF Southampton

How do you feel about your body?

Are you female and aged between 18-65?
If so, I am interested in hearing from you.

We are recruiting volunteers to take part in one of two research studies investigating the influence of different factors (such as mental imagery and self-compassion) on attitudes towards the self and body image.

Participation involves you first completing an online questionnaire. This should take no longer than 15 minutes.

If you score within the range we are interested in, you will be emailed by one of the researchers and invited to meet them for two sessions at the university, lasting between one and two hours at a time and spread out by a week.

You might also be required to complete a 30-minute task, every day, in between sessions.

PAYMENT: You will receive either course credits or direct debit payment for participating in the phases of the study which take place after completing the initial online questionnaire.

For those eligible to take part in the study, 3 credits/£1.50 will be given for every 15 minutes spent completing the study (including time spent completing the task away from the university).
If you are interested please complete the online questionnaire, which can be accessed on the following web address (also on the tear off slips below).

https://www.isurvey.soton.ac.uk/23308

Or contact us on il1g15@soton.ac.uk or klb1e12@soton.ac.uk if you would like the link forwarded to your email address. If you would like further information please contact Isabel Lewis (il1g15@soton.ac.uk) or Kate Bramwell (klb1e12@soton.ac.uk) to request a copy of the information sheet.

https://www.isurvey.soton.ac.uk/23308
il1g15@soton.ac.uk

https://www.isurvey.soton.ac.uk/23308
klb1e12@soton.ac.uk

https://www.isurvey.soton.ac.uk/23308
il1g15@soton.ac.uk

https://www.isurvey.soton.ac.uk/23308
klb1e12@soton.ac.uk

https://www.isurvey.soton.ac.uk/23308
il1g15@soton.ac.uk

https://www.isurvey.soton.ac.uk/23308
klb1e12@soton.ac.uk

Appendix D State self-concept clarity scale

State Self-Concept Clarity Scale

For each of the following statements, please indicate the extent to which the statement applies to you RIGHT NOW. Use the scale provided.

1. **My beliefs about myself often conflict with one another.**

1----------2----------3----------4----------5
Strongly Disagree — Strongly Agree

2. **My beliefs about myself seem to change very frequently.**

1----------2----------3----------4----------5
Strongly Disagree — Strongly Agree

3. **If I were asked to describe my personality, my description might end up being different from one day to another.**

1----------2----------3----------4----------5
Strongly Disagree — Strongly Agree

4. **Sometimes I feel that I am not really the person that I appear to be.**

1----------2----------3----------4----------5
Strongly Disagree — Strongly Agree

Appendix E Cronbach's alpha values

Control group

Measure	Pre α	Post α
SSCCS	.67	.79
SSES Positive subscale	.88	.88
SSES Negative subscale	.86	.87
PANAS positive subscale	.83	.87
PANAS negative subscale	.85	.86
ED15 total	.61	.78
SDI difference/concern	.76	.71
SDI achievement	.37	.45

Verbal group

Measure	Pre α	Post α
SSCCS	.49	.78
SSES Positive subscale	.9	.95
SSES Negative subscale	.85	.9
PANAS positive subscale	.9	.92
PANAS negative subscale	.73	.84
ED15 total	.84	.84
SDI difference/concern	.59	.76
SDI achievement	.55	.37

Appendix E

Imagery group

Measure	Pre *α*	Post *α*
SSCCS	.59	.74
SSES Positive subscale	.91	.9
SSES Negative subscale	.86	.83
PANAS positive subscale	.89	.86
PANAS negative subscale	.89	.92
ED15 total	.76	.83
SDI difference/concern	.83	.75
SDI achievement	.74	.44

Appendix F State self-esteem scale

State Self-Esteem Scale

For each of the items, please circle the number on the scale that best represents how you feel right now.

1. Pride

1 2 3 4 5 6 7 8 9 10 11
Not at all Extremely

2. Inadequate

1 2 3 4 5 6 7 8 9 10 11
Not at all Extremely

3. Competent

1 2 3 4 5 6 7 8 9 10 11
Not at all Extremely

4. Confident

1 2 3 4 5 6 7 8 9 10 11
Not at all Extremely

5. Incompetent

1 2 3 4 5 6 7 8 9 10 11
Not at all Extremely

6. Stupid

1 2 3 4 5 6 7 8 9 10 11
Not at all Extremely

7. Worthless

1 2 3 4 5 6 7 8 9 10 11
Not at all Extremely

8. Smart

1 2 3 4 5 6 7 8 9 10 11
Not at all Extremely

9. Resourceful

1 2 3 4 5 6 7 8 9 10 11
Not at all Extremely

10. Effective

1 2 3 4 5 6 7 8 9 10 11
Not at all Extremely

11. Ashamed

1 2 3 4 5 6 7 8 9 10 11
Not at all Extremely

12. Efficient

1 2 3 4 5 6 7 8 9 10 11
Not at all Extremely

Appendix G Self-discrepancy index

About you – How do you see yourself as a person?

Like most people, you probably like some things about yourself, but there may well be somethings that you would like to change.

Please complete the sentences below. In the space next to the word 'I' write any word or words to describe something about yourself that you would like to change. In the space next to the words 'but I would like', please write how you would ideally like to be. Then, after you have completed all five sentences please indicate, for each sentence, **how different** you are from your ideal, **how concerned** you are about this difference, and **how achievable** your ideal is. Please use the scales ranging from 'a little' to 'extremely', and check the box that best represents your view. Please be as truthful as you can.

		A little					Extremely
I……………………………………………	How different	1	2	3	4	5	6
But I would like………………………	How concerned	1	2	3	4	5	6
	How achievable	1	2	3	4	5	6
I……………………………………………	How different	1	2	3	4	5	6
But I would like………………………	How concerned	1	2	3	4	5	6
	How achievable	1	2	3	4	5	6
I……………………………………………	How different	1	2	3	4	5	6
But I would like………………………	How concerned	1	2	3	4	5	6
	How achievable	1	2	3	4	5	6
I……………………………………………	How different	1	2	3	4	5	6
But I would like………………………	How concerned	1	2	3	4	5	6
	How achievable	1	2	3	4	5	6
I……………………………………………	How different	1	2	3	4	5	6
But I would like………………………	How concerned	1	2	3	4	5	6
	How achievable	1	2	3	4	5	6

Appendix H Positive and negative affect scale

PANAS

This scale consists of a number of words that describe different feelings and emotions. Read each item and then circle the appropriate number next to that word. Indicate to what extent you feel this way right now, that is, at the present moment. Use the following scale provided to record your answers.

1 = very slightly or not at all
2 = a little
3 = moderately
4 = quite a bit
5 = extremely

1.	Interested	1	2	3	4	5
2.	Disinterested	1	2	3	4	5
3.	Excited	1	2	3	4	5
4.	Upset	1	2	3	4	5
5.	Strong	1	2	3	4	5
6.	Guilty	1	2	3	4	5
7.	Scared	1	2	3	4	5
8.	Hostile	1	2	3	4	5
9.	Enthusiastic	1	2	3	4	5
10.	Proud	1	2	3	4	5
11.	Irritable	1	2	3	4	5
12.	Alert	1	2	3	4	5
13.	Ashamed	1	2	3	4	5
14.	Inspired	1	2	3	4	5
15.	Nervous	1	2	3	4	5
16.	Determined	1	2	3	4	5
17.	Attentive	1	2	3	4	5
18.	Jittery	1	2	3	4	5
19.	Active	1	2	3	4	5
20.	Afraid	1	2	3	4	5

Appendix I Eating Disorder-15

ED-15

Over the past week, how often have I:	**Not at all**	**Rarely**	**Occasionally**	**Sometimes**	**Often**	**Most of the time**
1. Worried about losing control over my eating	0	1	2	3	4	5
2.Avoided activities or people because of the way I look	0	1	2	3	4	5
3.Been preoccupied with thoughts of food or eating	0	1	2	3	4	5
4.Compared my body negatively with others'	0	1	2	3	4	5
5.Avoided looking at my body (e.g in mirrors, wearing baggy clothes)	0	1	2	3	4	5
6.Felt distressed about my weight	0	1	2	3	4	5
7.Checked my body to reassure myself about my appearance	0	1	2	3	4	5

(e.g weighing myself, using mirrors)						
8.Followes strict rules about my eating	0	1	2	3	4	5
9.Felt distressed about my body shape	0	1	2	3	4	5
10. Worried that other people were judging me as a person because of my weight and appearance	0	1	2	3	4	5

If you have never used any of the following behaviours, please respond with N/A.

For those that you have used, over the past week, how many times have you:	**Number of times**
a) Binged (felt out of control of your eating, and eaten far more than a person normally would at one go)	
b) Vomited to control your weight (whether you had to make yourself sick or not)*	
Finally, on how many days in the past week have you:	**Number of days:**
c) Used laxatives to control your weight or shape	
d) Restricted or dieted in order to control your weight	
e) Exercised hard in order to control your weight	

*i.e using your fingers or medicines to make yourself sick, or vomiting without such aids

Appendix J Imagery task script

Positive Self-Imagery Interview

Participant Number _____

I would like you to think of a time when you have felt positive about yourself. You may have felt happy, confident, relaxed or similar.

Often when people feel happy, confident or relaxed they feel good about themselves and may have a positive image of themselves in their mind. I'm going to try to help you get hold of the image and the general sense of yourself you have when you are feeling good about yourself.

Please can you take a few minutes to think of a time when you felt good about yourself?

Pause

Have you been able to think of a time when you felt good about yourself?
Yes/no.

-*If the participant says no say,*
-Try to keep thinking, it could be any situation where you have felt good about yourself.

-*Pause and ask,*
-Have you been able to think of a time you felt positive about yourself?

Now, in your mind, I would like you to try to recreate that situation and the image you have of yourself as vividly as possible. You may wish to close your eyes.

Pause

I am now going to ask you some questions…

What is happening in the image you can see right now? Please describe it to me.
Where are you?
What are you doing?
Who are you with?
How do you see yourself in the image?
What do you look like?

-*Summarise and check if each part is right.*
-*Ask for more details if the participant is brief.*

I would like you to stay focusing on that situation, try to get a clear image or sense of what it was like.

Pause

How does the image make you feel about yourself?

Appendix J

Do you have a positive sense of yourself in the situation?
-*Yes/no*
-*If no identify another situation.*

As you think about that situation now, do you have any sensations in your body?

Summarise the setting and image.

As you continue to hold the image of yourself in your mind, how positive is your view of yourself on a scale of 0 to 100, where 0 represents not at all positive and 100 represents feeling extremely positive about yourself. (Manipulation check question).

-*If the participants response is not 60 or above choose another situation*

As you hold the image in mind, how vivid is the image/sense of yourself on a scale of 0-100, with 0 representing not at all vivid/strong and 100 representing extremely vivid/strong? (Manipulation check question).

-*If the participants response is not 60 or above ask for more details about the situation and then repeat the question.*

What emotions do you feel now as you hold the image in mind?
Can you rate how strong that emotion is on a scale of 0 to 100, with 0 representing not at all strong and 100 representing extremely strong.
Do you feel any other emotions right now as you hold the image in mind?
-*Rate each emotion using the scale above.*

Keeping the image of yourself in mind can you tell me how you feel about yourself in this present moment?

I am now going to summarise what you have described to me and after I want you to let me know if I have captured the image correctly.

Confirm whether I have captured the image correctly.

Ok, now I want you to hold the image in mind whilst you complete the questionnaires again. Please open your eyes.

Give the participant the questionnaires to complete. Once the participant has completed the questionnaires say,

Now I just have one more question to ask you. What percentage of time were you able to hold the image you had of yourself in mind whilst you completed the questionnaires, with 0% representing none of the time and 100% representing all of the time? (Manipulation check question).

Appendix K Cognitive restructuring worksheet

Thought Record Sheet – 7 column

Situation / Trigger	**Feelings** Emotions – (Rate 0 – 100%) Body sensations	**Unhelpful Thoughts / Images**	**Facts that <u>support</u> the unhelpful thought**	**Facts that provide evidence <u>against</u> the unhelpful thought**	**Alternative, more realistic and balanced perspective**	**Outcome** Re-rate emotion
What happened? Where? When? Who with? How?	*What emotion did I feel at that time? What else? How intense was it?* *What did I notice in my body? Where did I feel it?*	*What went through my mind? What disturbed me? What did those houghts/images/memories mean to me, or say about me or the situation? What am I responding to? What 'button' is this pressing for me? What would be the worst thing about that, or that could happen?*	*What are the facts? What facts do I have that the unhelpful thought/s are totally true?*	*What facts do I have that the unhelpful thought/s are NOT totally true? Is it possible that this is opinion, rather than fact? What have others said about this?*	*STOPP! Take a breath….* *What would someone else say about this situation? What's the bigger picture? Is there another way of seeing it? What advice would I give someone else? Is my reaction in proportion to the actual event? Is this really as important as it seems?*	*What am I feeling now? (0-100%)* *What could I do differently? What would be more effective?* *Do what works! Act wisely. What will be most helpful for me or the situation? What will the consequences be?*

www.getselfhelp.co.uk Carol Vivyan 2010, adapted from Padesky 1995. Permission to use for therapy purposes www.get.gg

Appendix L Information sheet for control group

UNIVERSITY OF Southampton

Participant Information Sheet (Version 3, 20.02.17)

Study Title: The impacts of imagery and thought challenging on sense of self.

Researcher: Kate Bramwell (Trainee Clinical Psychologist)
Isabel Lewis (Trainee Clinical Psychologist)

ERGO Study ID number: 25440

Please read this information carefully before deciding to take part in this research. If you are happy to participate you will be asked to sign a consent form.

What is the research about?
I am carrying out this piece of research as part of my doctorate in clinical psychology. This study aims to compare the impacts of mental images of ourselves and thoughts about ourselves on our sense of self. Imagery is a relatively new area of research and it is therefore hoped that the findings of this study will help to develop psychological theory and inform future psychological interventions. It is hoped to add to the existing research about how thoughts affect our sense of self.

Why have I been chosen?
You have been chosen to take part in the research because you scored within the range that the study is interested in when you completed the online screening questionnaire.

What will happen to me if I take part?
If you agree to take part in this study, you will be required to complete 5 paper based questionnaires and a demographic information sheet which asks for your age; this should take about half an hour. You will then be required to return to the lab one week later to complete the questionnaires again which will take another half an hour.

Are there any benefits in my taking part?
You will benefit from taking part in the form of payment/university credits. We also hope this research will improve our understanding of the impacts of imagery and verbal interventions on how people feel about and view themselves. This will hopefully inform future development of psychological interventions for clinical populations.

Will I receive payment for taking part?
You will receive the payment/credits as per the advert for completing the study. If you decide not to complete all parts of the study, you will receive payment/credits for the parts you do complete.

Are there any risks involved?
There are no foreseeable risks involved in taking part in the study. However, if you feel upset or distressed after completing questionnaires about yourself, your eating behaviours and shape, the researcher will be available to talk through this with you at the end of the session. You will also receive a debrief sheet which will contain details of how to access support if you have any concerns about your self-esteem, weight, shape or mood.

Will my participation be confidential?
This study is being carried out in accordance with the Data Protection Act. Any written reports of the study and findings will not include your name or any other identifying information. You will be assigned a numerical ID code so that when your data is entered into the computer database, your data cannot be linked to your name and thus ensure confidentiality. The database will be kept on a password protected computer and the paper based questionnaires you complete will be kept in a locked cabinet.

What happens if I change my mind?
You have the right to withdraw from this study at any time without giving a reason, without your legal rights being affected. There will be no consequences for withdrawing from the study and you will receive credits/money for the time you have spent taking part.

What happens if something goes wrong?
If at any time you have any concerns about your rights as a participant in the study or you feel you have been placed at risk, you can contact:

Chair of the Ethics Committee
Department of Psychology
University of Southampton
Southampton
SO17 1BJ
Email: fshs-rso@soton.ac.uk
Tel: 02380 593 856

Where can I get more information?
If you have any further questions about the research, please contact Kate Bramwell (Trainee Clinical Psychologist) at klb1e12@soton.ac.uk.

Appendix M Information sheet for imagery group

UNIVERSITY OF Southampton

Participant Information Sheet (Version 3, 20.02.17)

Study Title: The impacts of imagery and thought challenging on sense of self.

Researchers: Kate Bramwell (Trainee Clinical Psychologist)
Isabel Lewis (Trainee Clinical Psychologist)

ERGO Study ID number: 25440

Please read this information carefully before deciding to take part in this research. If you are happy to participate you will be asked to sign a consent form.

What is the research about?
I am carrying out this piece of research as part of my doctorate in clinical psychology. This study aims to compare the impacts of mental images of ourselves and thoughts about ourselves on our sense of self. Imagery is a relatively new area of research and it is therefore hoped that the findings of this study will help to develop psychological theory and inform future psychological interventions. It is hoped to add to the existing research about how thoughts affect our sense of self.

Why have I been chosen?
You have been chosen to take part in the research because you scored within the range that the study is interested in when you completed the online screening questionnaire.

What will happen to me if I take part?
If you agree to take part in this study, we will require approximately 2 hours of your time in the lab and half an hour each day over the course of a week. Initially, you will be asked to complete 5 paper based questionnaires and a demographic information sheet which asks for your age. You will then be asked a series of questions by the researcher about an image you have brought to mind and views you have of yourself whilst holding the image in mind. This part of the study will be audio-recorded for quality control purposes. You will be given instructions to repeat the task at home, once each day, which should take you about half an hour per day. You will then be required to return to the lab after one week where you will repeat the task again and complete the 5 paper based questionnaires. You will then be debriefed by the researcher and will have the chance to ask questions.

Are there any benefits in my taking part?
You will benefit from taking part in the form of payment/university credits. We also hope this research will improve our understanding of the impacts of imagery and verbal interventions on how people feel about and view themselves. This will hopefully inform future development of psychological interventions for clinical populations.

Will I receive payment for taking part?
You will receive the payment/credits as per the advert for completing the study. If you decide not to complete all parts of the study, you will receive payment/credits for the parts you do complete.

Are there any risks involved?
There are no foreseeable risks involved in taking part in the study. However, if you feel upset or distressed after accessing an image of yourself or after completing questionnaires about yourself, your eating behaviours and shape, the researcher will be available to talk through this with you at the end of the session. You will also receive a debrief sheet which will contain details of how to access support if you have any concerns about your self-esteem, weight, shape or mood.

Will my participation be confidential?
This study is being carried out in accordance with the Data Protection Act. Any written reports of the study and findings will not include your name or any other identifying information. You will be assigned a numerical ID code so that when your data is entered into the computer database, your data cannot be linked to your name and thus ensure confidentiality. The database will be kept on a password protected computer and the paper based questionnaires you complete will be kept in a locked cabinet.

What happens if I change my mind?
You have the right to withdraw from this study at any time without giving a reason, without your legal rights being affected. There will be no consequences for withdrawing from the study and you will receive credits/money for the time you have spent taking part.

What happens if something goes wrong?
If at any time you have any concerns about your rights as a participant in the study or you feel you have been placed at risk, you can contact:

Chair of the Ethics Committee
Department of Psychology
University of Southampton
Southampton
SO17 1BJ
Email: fshs-rso@soton.ac.uk
Tel: 02380 593 856

Where can I get more information?
If you have any further questions about the research, please contact Kate Bramwell (Trainee Clinical Psychologist) at klb1e12@soton.ac.uk.

Appendix N Information sheet for verbal group

UNIVERSITY OF Southampton

Participant Information Sheet (Version 3, 20.02.17)

Study Title: The impacts of imagery and thought challenging on sense of self.

Researchers: Kate Bramwell (Trainee Clinical Psychologist)
Isabel Lewis (Trainee Clinical Psychologist)

ERGO Study ID number: 25440

Please read this information carefully before deciding to take part in this research. If you are happy to participate you will be asked to sign a consent form.

What is the research about?
I am carrying out this piece of research as part of my doctorate in clinical psychology. This study aims to compare the impacts of mental images of ourselves and thoughts about ourselves on our sense of self. Imagery is a relatively new area of research and it is therefore hoped that the findings of this study will help to develop psychological theory and inform future psychological interventions. It is hoped to add to the existing research about how thoughts affect our sense of self.

Why have I been chosen?
You have been chosen to take part in the research because you scored within the range that the study is interested in when you completed the online screening questionnaire.

What will happen to me if I take part?
If you agree to take part in this study, we will require approximately 2 hours of your time in the lab and half an hour each day over the course of a week. Initially, you will be asked to complete 5 paper based questionnaires and a demographic information sheet which asks for your age. The researcher will then ask you to bring a negative thought to mind and write down evidence that supports and evidence that does not support the thought. You will be given instructions to repeat the task at home, once each day, which should take you about half an hour per day. You will then be required to return to the lab after one week where you will repeat the task again and complete the 5 paper based questionnaires. You will then be debriefed by the researcher and will have the chance to ask questions.

Are there any benefits in my taking part?
You will benefit from taking part in the form of payment/university credits. We also hope this research will improve our understanding of the impacts of imagery and verbal interventions on how people feel about and view themselves. This will hopefully inform future development of psychological interventions for clinical populations.

Will I receive payment for taking part?
You will receive the payment/credits as per the advert for completing the study. If you decide not to complete all parts of the study, you will receive payment/credits for the parts you do complete.

Are there any risks involved?
There are no foreseeable risks involved in taking part in the study. However, if you feel upset or distressed after accessing a negative thought about yourself or after completing questionnaires about yourself, your eating behaviours and shape, the researcher will be available to talk through this with you at the end of the session. You will also receive a debrief sheet which will contain details of how to access support if you have any concerns about your self-esteem, weight, shape or mood.

Will my participation be confidential?
This study is being carried out in accordance with the Data Protection Act. Any written reports of the study and findings will not include your name or any other identifying information. You will be assigned a numerical ID code so that when your data is entered into the computer database, your data cannot be linked to your name and thus ensure confidentiality. The database will be kept on a password protected computer and the paper based questionnaires you complete will be kept in a locked cabinet.

What happens if I change my mind?
You have the right to withdraw from this study at any time without giving a reason, without your legal rights being affected. There will be no consequences for withdrawing from the study and you will receive credits/money for the time you have spent taking part.

What happens if something goes wrong?
If at any time you have any concerns about your rights as a participant in the study or you feel you have been placed at risk, you can contact:

Chair of the Ethics Committee
Department of Psychology
University of Southampton
Southampton
SO17 1BJ
Email: fshs-rso@soton.ac.uk
Tel: 02380 593 856

Where can I get more information?
If you have any further questions about the research, please contact Kate Bramwell (Trainee Clinical Psychologist) at klb1e12@soton.ac.uk.

Appendix O Consent form for control and verbal groups

UNIVERSITY OF Southampton

CONSENT FORM (Version 3, 20.02.17)

Study title: The impacts of imagery and thought challenging on sense of self.

Researcher names: Kate Bramwell (Trainee Clinical Psychologist)
Isabel Lewis (Trainee Clinical Psychologist)

ERGO Study ID number: 25440

Please initial the box(es) if you agree with the statement(s):

I have read and understood the information sheet (20.02.17/version 3) and have had the opportunity to ask questions about the study	☐
I agree to take part in this research project and agree for my data to be used for the purpose of this study	☐
I understand my participation is voluntary and I may withdraw at any time without my legal rights being affected	☐

Name of participant (print name)……

Signature of participant……..

Date……

Appendix P Consent form for imagery group

UNIVERSITY OF Southampton

CONSENT FORM (Version 3, 20.02.17)

Study title: The impacts of imagery and thought challenging on sense of self.

Researcher names: Kate Bramwell (Trainee Clinical Psychologist)
Isabel Lewis (Trainee Clinical Psychologist)

ERGO Study ID number: 25440

Please initial the box(es) if you agree with the statement(s):

I have read and understood the information sheet (20.02.17/version 3) and have had the opportunity to ask questions about the study	☐
I agree to take part in this research project and agree for my data to be used for the purpose of this study	☐
I understand my participation is voluntary and I may withdraw at any time without my legal rights being affected	☐
I agree for the imagery interview to be audio recorded for the purpose of this study	☐

Name of participant (print name)……

Signature of participant……..

Date……

Appendix Q Demographic information sheet

Demographic Information

Please complete the following details:

Age:

Occupation:

Ethnicity:

Years of full time education:

For researcher to complete
Participant Number:

Appendix R Instructions for imagery task

Each day you will receive an email reminder stating the following:

"Please remember to complete the imagery exercise for today. Here is a reminder of the instructions:

Directions: *Think of a time when you have felt positive about yourself. You may have felt happy, confident, relaxed or similar. Often when people feel happy, confident or relaxed they feel good about themselves and may have a positive image of themselves in their mind. Try to get hold of an image and the general sense of yourself you have when you are feeling good about yourself.*

Please can you take a few minutes to think of a time when you felt good about yourself.

It could be any situation where you have felt good about yourself.

In your mind, try to recreate that situation and the image you have of yourself as vividly as possible. You may wish to close your eyes.

Think about:

- *What is happening in the image you can see?*
- *Where are you?*
- *What are you doing?*
- *Who are you with?*
- *How do you see yourself in the image?*
- *What do you look like?*

Stay focusing on that situation, try to get a clear image or sense of what it was like.

Think about:

- *How does the image make you feel about yourself?*
- *Do you have any sensations in your body?*
- *What emotions you feel now as you hold the image in mind?*

Please now spend 5-10 minutes completing this task.

Please state your preferred email address to be contacted on:

……

Time to receive reminder to complete task in the day:

……

Appendix S Instructions for cognitive restructuring task

Each day you will receive an email reminder stating the following:

"Please remember to complete the thought challenging exercise for today. Here is a reminder of the instructions:

Directions: *Think about a situation that occurred this week which was difficult and left you feeling upset – it might be something that happened to you, something that you did or a judgment that you made about yourself.*

When thinking about this situation write down how you felt and a distressing thought that went through your mind. Complete the thought challenging record sheet using the prompts in each column to help you.

Please state your preferred email address to be contacted on:

……

Time to receive reminder to complete task in the day:

……

Appendix T Imagery task tick sheet

Daily Imagery Task Record Sheet

Please complete the imagery exercise every day for the next week. Try your best to think of a similar image each day. Tick off each day when you have done the exercise.

Day 1	**Completed**	☐
Day 2	**Completed**	☐
Day 3	**Completed**	☐
Day 4	**Completed**	☐
Day 5	**Completed**	☐
Day 6	**Completed**	☐

Appendix U Verbal task tick sheet

Daily Thought Challenging Record Sheet

Please complete this thought challenging exercise every day for the next week. Try your best to think of a distressing situation and thought from the day or week but if you cannot, think of one from the most recent distressing situation you can remember. Tick off each day when you have done the exercise.

Day 1	**Completed**	☐
Day 2	**Completed**	☐
Day 3	**Completed**	☐
Day 4	**Completed**	☐
Day 5	**Completed**	☐
Day 6	**Completed**	☐

Appendix V Debrief sheet

UNIVERSITY OF Southampton

Comparing the effects of an imagery intervention and a verbal intervention on aspects of the self-concept in individuals who have concerns about their eating.

Debriefing Statement (Version 3, 20.02.17)

The aim of this research was to compare the impact of a self-imagery intervention and a verbal intervention on how individuals who report concerns about their eating, body shape and weight, feel about themselves. We were particularly interested in whether the interventions had any effect over the course of a week and whether one intervention had more of an effect than the other.

It is expected that compared to pre-intervention scores, participants who repeatedly accessed a positive image of themselves and those who repeatedly challenged a negative thought about themselves will report higher self-esteem, higher self-concept clarity (how stable your sense of self is), improved mood and lower concerns about eating, weight and shape. We also anticipate that the imagery intervention will have more of an effect than the verbal intervention and that participants in both intervention groups will report larger differences in pre-post scores than those in the control group.

We anticipate these findings because previous research has shown that retrieving a positive image of the self, activates a positive view of the self and positive beliefs about the self which leads to an increase in self-esteem, mood and self-concept clarity. Challenging a negative thought about the self has been found to reduce the discrepancy between the actual self and the ideal view of the self and thus increase self-esteem, mood and self-concept clarity. Research also suggests the self-concept is developed at a time where cognitive material is stored in visual forms and imagery may therefore be able to access the beliefs involved in the self-concept more easily than verbal techniques.

The data will provide information on the impact of imagery and verbal techniques on the sense of self in individuals who have concerns about their eating, weight and shape. We hope that the results will help to develop psychological interventions for clinical populations. If you would like to find out more about this area of research, please see the attached references for further reading.

Once again the results of this study will not include your name or any other identifying characteristics. The research did not use deception. You may have a copy of this summary if you wish and a copy of the summary of the research will be available once the project has been completed.

If you have any concerns about your mood or self-esteem, please contact the service below:
Steps 2 Wellbeing
Tel: 0800 612 7000

Appendix V

Website: http://www.steps2wellbeing.co.uk/
Steps 2 Wellbeing is a free, confidential NHS service for people aged 18 and over. The service offers a range of treatments for people experiencing low mood/depression, anxiety or stress. You can self-refer to the service.

If you have any concerns about your eating, body shape or weight, please contact your GP to discuss a potential referral to your local Eating Disorder Service:
April House
9 Bath Road
Bitterne
Southampton
SO19 5ES
Tel: 02380 819 000

April House is an Eating Disorders Service which provides support to individuals over 18 who have an eating disorder. April House's leaflet is attached to this statement which provides further information and details on how to access the service.

Furthermore, www.b-eat.co.uk is a good resource for people who have concerns related to eating disorders. It provides details of helplines and online support and self-help groups.

If you have any further questions please contact Kate Bramwell at klb1e12@soton.ac.uk. A copy of the final report will be available from August 2018.

If you have questions about your rights as a participant in this research, or if you feel that you have been placed at risk, you may contact the Chair of the Ethics Committee, Psychology, University of Southampton, Southampton, SO17 1BJ. Phone: +44 (0)23 8059 3856, email fshs-rso@soton.ac.uk.

Thank you for your participation in this research.

Signature _____ Date _____

Name_____

Further reading:

Cooper, M. J. (2009). Imagery and the negative self in eating disorders. In L. Stopa (Ed.), *Imagery and the threatened self: Perspectives on mental imagery and the self in cognitive therapy* (pp. 181-205). New York, NY: Routledge.

Farrar, S., Stopa, L. & Turner, H. (2015). Self-imagery in individuals with high body dissatisfaction: The effect of positive and negative self-imagery on aspects of the self-concept. *Journal of Behavior Therapy and Experimental Psychiatry, 46*, 8- 13. doi: 10.1016/j.jbtep.2014.07.011.

Hulme, N., Hirsch, C., & Stopa, L. (2011). Images of the self and self-esteem: Do positive self-images improve self-esteem in social anxiety? *Cognitive Behaviour Therapy, 41*(2), 163-173. doi:10.1080/16506073.2012.664557.

Appendix W Ethical approval email

Your Ethics Submission (Ethics ID:25440) has been reviewed and approved

ERGO [ergo@soton.ac.uk]
Submission Number: 25440
Submission Name: Comparing the effects of an imagery intervention and a verbal intervention on aspects of the self-concept in an at risk eating disorder population.
This is email is to let you know your submission was approved by the Ethics Committee.

You can begin your research unless you are still awaiting specific Health and Safety approval (e.g. for a Genetic or Biological Materials Risk Assessment)

ERGO : Ethics and Research Governance Online
http://www.ergo.soton.ac.uk

DO NOT REPLY TO THIS EMAIL

List of references

American Psychiatric Association (2013). *Diagnostic and statistical manual of mental disorders*. (5th ed.). Washington, DC: American Psychiatric Association.

Armijo-Olivo, S., Stiles, C. R., Hagen, N. A., Biondo, P. D., & Cummings, G. G. (2012). Assessment of study quality for systematic reviews: A comparison of the Cochrane Collaboration Risk of Bias Tool and the Effective Public Health Practice Project Quality Assessment Tool: methodological research. *Journal of Evaluation in Clinical Practice, 18*(1), 8-12. doi: 10.1111/j.1365-2753.2010.01516.x

Baumgardner, A. H. (1990). To know oneself is to like oneself: Self-certainty and self-affect. *Journal of Personality and Social Psychology, 58*(6), 1062-1072. doi: 10.1037/0022-3514.58.6.1062

Beck, A. T. (1976). *Cognitive therapy and the emotional disorders*. New York, NY: International Universities Press.

Beck, A. T., Freeman, A., Pretzer, J., Davis, D. D., Fleming B., Ottavani, R…Trexler, L. (1990). *Cognitive therapy of personality disorders*. New York, NY: Guilford Press.

Beck A. T., Laude R., & Bohnert, M. (1974). Ideational components of anxiety neurosis. *Archives of General Psychiatry, 31*, 319–325. doi: 10.1001/archpsyc.1974.01760150035005

Beck, A. T., Rush, J. T., Shaw, B. F., & Emery, G. (1979). *Cognitive therapy of depression*. New York, NY: Guildford Press.

Beike, D. R., Kleinknecht, E., & Wirth-Beaumont, E. T. (2004). How emotional and nonemotional memories define the self. In D. R. Beike, J. M. Lampinen, & D. A. Behrend (Eds.), *The self and memory (*pp. 141-159). Hove, UK: Psychology Press.

Bers, S. A., Blatt, S. J., & Dolinsky, A. (2004). The sense of self in anorexia-nervosa patients: A psychoanalytically informed method for studying self representation. *Psychoanalytic Study of the Child, 59*, 294–315.

Bers, S. A., & Quinlan, D. M. (1992). Perceived-competence deficit in anorexia nervosa. *Journal of Abnormal Psychology*, *101*(3), 423-431. doi: 10.1037/0021-843X.101.3.423

Brettle, A. J., & Long, A. F. (2001). Comparison of bibliographic databases for information on the rehabilitation of people with severe mental illness. *Bulletin of the Medical Library Association, 89*(4), 353-362.

List of references

Brewin, C. R. (2006). Understanding cognitive behaviour therapy: A retrieval competition account. *Behaviour Research and Therapy, 44*(6), 765-784. doi: 10.1016/j.brat.2006.02.005

Bruch, H. (1973). *Eating disorders: Obesity, anorexia nervosa, and the person within*. New York, NY: Basic Books.

Campbell, J. D. (1990). Self-esteem and clarity of the self-concept. *Journal of Personality and Social Psychology, 59*(3), 538-549. doi: 10.1037/0022-3514.59.3.538

Campbell, J. D., Trapnell, P. D., Heine, S. J., Katz, I. M., Lavallee, L. F., & Lehman, D. R. (1996). Self-concept clarity: Measurement, personality correlates and cultural boundaries. *Journal of Personality and Social Psychology, 70*(1), 141-156. doi: 10.1037/0022-3514.70.1.141

Cash, T. F., & Deagle, E. A. (1997). The nature and extent of body image disturbances in anorexia nervosa and bulimia nervosa: A meta-analysis. *International Journal of Eating Disorders, 22*(2), 107-125.

Cockerham, E., Stopa, L., Bell, L., & Gregg, A. (2009). Implicit self-esteem in bulimia nervosa. *Journal of Behavior Therapy & Experimental Psychiatry, 40*(2), 265-273. doi:10.1016/j.jbtep.2008.12.003

Conway, M. A., & Pleydell-Pearce, C. W. (2000). The construction of autobiographical memories in the self-memory system. *Psychological Review, 107*(2), 261-288. doi: 10.1037/0033-295X.107.2.261

Cooper, M. (2009). Imagery and the negative self in eating disorders. In L. Stopa (Ed.), *Imagery and the threatened self: Perspectives on mental imagery and the self in cognitive therapy.* (pp. 181-205). New York, NY: Routledge/Taylor & Francis Group.

Cooper, M. (2011). Working with imagery to modify core beliefs in people with eating disorders: A clinical protocol. *Cognitive and Behavioral Practice, 18*(4), 454-465. doi: 10.1016/j.cbpra.2010.08.003

Cooper, M., Todd, G., & Turner, H. (2007). The effects of using imagery to modify core emotional beliefs in bulimia nervosa: An experimental pilot study. *Journal of Cognitive Psychotherapy, 21*(2), 117-122. doi: 10.1891/088983907780851577

Cooper, M., Todd, G., & Wells, A. (1998). Content, origins and consequences of dysfunctional beliefs in anorexia nervosa and bulimia nervosa. *Journal of Cognitive Psychotherapy, 12*(3), 213-230.

Cooper, M., Wells, A., & Todd, G. (2004). A cognitive model of bulimia nervosa. *British Journal of Clinical Psychology, 43*, 1-16. doi: 10.1348/014466504772812931

Demo, D. H., & Savin-Williams, R. C. (1992). Self-concept stability and change during adolescence. In R. P. Lipka & T. M. Brinthaupt (Eds.), *Self-perspectives across the life span* (pp. 116-150). Albany, NY: State University of New York Press.

Dingemans, A. E., Spinhoven, P., & Van Furth, E. F. (2006). Maladaptive core beliefs and eating disorder symptoms. *Eating Behaviors, 7*(3), 258-265. doi: 10.1016/j.eatbeh.2005.09.007

Dittmar, H., Beattie, J., & Friese, S. (1996). Objects, decision considerations and self-image in men's and women's impulse purchases. *Acta Psychologica, 93*(1), 187-206. doi: 10.1016/0001-6918(96)00019-4

Dittmar, H., Halliwell, E., & Stirling, E. (2009). Understanding the impact of thin media models on women's body-focused affect: The roles of thin-ideal internalization and weight-related self-discrepancy activation in experimental exposure effects. *Journal of Social and Clinical Psychology*, *28*(1), 43-72. doi: 10.1521/jscp.2009.28.1.43

Duarte, C., Pinto-Gouveia, J., & Stubbs, R. J. (2017). Compassionate attention and regulation of eating behaviour: A pilot study of a brief low-intensity intervention for binge eating. *Clinical Psychology and Psychotherapy, 24*(6), 1437-1447. doi: 10.1002/cpp.2094

Dudek, J., Ostaszewski, P., & Malicki, S. (2014). Transdiagnostic models of eating disorders and therapeutic methods: The example of Fairburn's cognitive behaviour therapy and acceptance and commitment therapy. *Roczniki Psychologiczne, 17*(1), 25-39.

Dugue, R., Keller, S., Tuschen-Kaffier, B., & Jacob, A. (2016). Exploring the mind's eye: Contents and characteristics of mental images in overweight individuals with binge eating behaviour. *Psychiatry Research, 246,* 554-560. doi: 10.1016/j.psychres.2016.10.028

Effective Public Health Practice Project. (1998). Quality Assessment Tool For Quantitative Studies. Hamilton, ON: Effective Public Health Practice Project. Retrieved from: https://merst.ca/ephpp/

Esplen, M. J., & Garfinkel, P. E. (1998). Guided imagery treatment to promote self-soothing in bulimia nervosa: A theoretical rationale. *The Journal of Psychotherapy Practice and Research, 7*(2), 102-118.

Esplen, M. J., Garfinkel, P. E., Olmsted, M., Gallop, R. M., & Kennedy, S. (1998). A randomized controlled trial of guided imagery in bulimia nervosa. *Psychological Medicine, 28*(6), 1347-1357. doi: 10.1017/S0033291798007405

List of references

Fairburn, C. G., Beglin, S. J. (1994). Assessment of eating disorder psychopathology: Interview or self-report questionnaire? *International Journal of Eating Disorders, 16,* 363-370. doi: 10.1002/1098-108X.

Fairburn, C., Cooper, Z., & Shafran, R. (2003). Cognitive behaviour therapy for eating disorders: A "transdiagnostic" theory and treatment. *Behaviour Research and Therapy, 41*, 509–528. doi: 10.1016/S0005-7967(02)00088-8

Fairburn, C. G., & Wilson, G. T. (1993). Binge eating: Definition and classification. In C. G. Fairburn & G. T. Wilson (Eds.), *Binge eating: Nature, assessment, and treatment* (pp. 3-14). New York, NY: Guilford Press.

Farrar, S., Stopa, L., & Turner, H. (2015). Self-imagery in individuals with high body dissatisfaction: The effect of positive and negative self-imagery on aspects of the self-concept. *Journal of Behavior Therapy and Experimental Psychiatry, 46,* 8-13. doi: 10.1016/j.jbtep.2014.07.011

Favaro, A., Ferrara, S., & Santonastaso, P. (2003). The spectrum of eating disorders in young women: A prevalence study in a general population sample. *Psychosomatic Medicine, 65*(4), 701-108.

Field, A. (2013). *Discovering statistics using IBM SPSS statistics* (4th ed.). London, England: Sage Publications Ltd.

Forman, E. M., Herbert, J. D., Moitra, E., Yeomans, P. D., & Geller, P. A. (2007). A randomized controlled effectiveness trial of acceptance and commitment therapy and cognitive therapy for anxiety and depression. *Behavior Modification, 31*(6), 772-799. doi: 10.1177/0145445507302202.

Greenberg, D. L., Rice, H. J., Cooper, J. J., Cabeza, R., Rubin, D. C., & LaBar, K. S. (2005). Co-activation of the amygdala, hippocampus and inferior frontal gyrus during autobiographical memory retrieval. *Neuropsychologia, 43*(5), 659–674. doi: 10.1016/j.neuropsychologia.2004.09.002

Greenwald, A. G., & Farnham, S. D. (2000). Using the implicit association test to measure self-esteem and self-concept. *Journal of Personality and Social Psychology*, *79*(6), 1022-1038. doi: 10.1037/0022-3514.79.6.1022

Hackmann, A., Clark, D., & McManus, F. (2000). Recurrent images and early memories in social phobia, *Behaviour Research and Therapy, 38*(9), 601-610. doi: 10.1016/S0005-7967(99)00161-8

Hales, S., Blackwell, S., Di Simplicio, M, Lyadurai, L., Young, K., & Holmes, E. (2015). Imagery-based cognitive-behavioural assessment. In G. Brown & D. Clark (Ed.), *Assessment in cognitive therapy*. (pp. 69-93). New York, NY: Guilford Press.

Harlowe, J., Farrar, S., Stopa, L., & Turner, H. (In press). The impact of self-imagery on aspects of the self-concept in eating disorders. *Journal of Behaviour Therapy and Experimental Psychiatry.* doi.org/10.1016/j.jbtep.2018.05.002

Higgins, E. T. (1987). Self-discrepancy: A theory relating self and affect. *Psychological Review, 94*(3), 319-340. doi: 10.1037/0033-295X.94.3.319

Higgins, E. T. (1989). Self-discrepancy theory: What patterns of self-beliefs cause people to suffer? *Advances in Experimental Social Psychology, 22*, 93-136. doi: 10.1016/S0065-2601(08)60306-8

Hinrichsen, H., Morrison, T., Waller, G., & Schmidt, U. (2007). Triggers of self-induced vomiting in bulimic disorders: The roles of core beliefs and imagery. *Journal of Cognitive Psychotherapy, 21*(3), 261-272. doi: 10.1891/088983907781494528

Holmes, E. A., Arntz, A., & Smucker, M. R. (2007). Imagery rescripting in cognitive behaviour therapy: Images, treatment techniques and outcomes. *Journal of Behavior Therapy and Experimental Psychiatry, 38*, 297-305. doi: 10.1016/j.jbtep.2007.10.007

Holmes, E. A., & Mathews, A. (2010). Mental imagery in emotion and emotional disorders. *Clinical Psychology Review, 30*(3), 349–62. doi: 10.1016/j.cpr.2010. 01.001

Howell, D. C. (1998). *Statistical methods in human sciences.* New York, NY: Wadsworth.

Hulme, N., Hirsch, C., & Stopa, L. (2012). Images of the self and self-esteem: Do positive self-images improve self-esteem in social anxiety? *Cognitive Behaviour Therapy, 41*(2), 163-173. doi: 10.1080/16506073.2012.664557

Kang, H. (2013). The prevention and handling of missing data. *Korean Journal of Anesthesiology, 64*(5), 402-406. doi: 10.4097/kjae.2013.64.5.402

Kaplan, A. S., & Garfinkel, P. E. (1999). Difficulties in treating patients with eating disorders: A review of patient and clinician variables. *Canadian Journal of Psychiatry 44*(7), 665-670. doi: 10.1177/070674379904400703

Kinderman, P., & Bentall, R. P. (1997). Causal attributions in paranoia and depression: Internal, personal and situational attributions for negative events. *Journal of Abnormal Psychology, 106*, 341–345. doi: 10.1037/0021-843X.106.2.341

Lampard, A. M., Tasca, G. A., Balfour, L., & Bissada, H. (2013). An evaluation of the transdiagnostic cognitive-behavioural model of eating disorders. *European Eating Disorders Review, 21*(2), 89-174. doi: 10.1002/erv.2214

Layden, M. A., Newman, C. F., Freeman, A., & Morse, S. B. (1993). *Cognitive therapy of borderline personality disorder*. Needham Heights, MA: Allyn & Bacon.

Linardon, J., Wade, T., De La Piedad Garcia, X., & Brennan, L. (2017). The efficacy of cognitive behaviour therapy for eating disorders: A systematic review and meta-analysis. *Journal of Consulting and Clinical Psychology, 85*(11), 1080-1094. doi: 10.1037/ccp0000245

Luke, M., & Stopa, L. (2009). Psychological theories of the self and their application to clinical disorders. In L. Stopa (Ed.), *Imagery and the threatened self: Perspectives on mental imagery and the self in cognitive therapy.* (pp. 15-64). New York., NY: Routledge/Taylor & Francis Group.

Marks, D. (1973). Visual imagery differences in the recall of pictures. *British Journal of Psychology, 64*(1), 17-24. doi: 10.1111/j.2044-8295.1973.tb01322.x

McDaniel, B. L., & Grice, J. W. (2008). Predicting psychological well-being from self-discrepancies: A comparison of idiographic and nomothetic measures. *Self and Identity, 7*(3), 243-261. doi: 10.1080/15298860701438364

McFarland, C., & Ross, M. (1982). Impact of causal attributions on affective reactions to success and failure. *Journal of Personality and Social Psychology, 43*(5), 937-946. doi: 10.1037/0022-3514.43.5.937.

Micali, N., Hagberg, K. W., Petersen, I., & Treasure, J. (2013). The incidence of eating disorders in the UK in 2000-2009: Findings from the General Practice Research Database. *BMJ Open, 3*(5), 1-8. doi: 10.1136/bmjopen-2013-002646

Moreno-Domínguez, S., Rodríguez-Ruiz, S., Fernández-Santaella, M., Jansen, A., & Tuschen-Caffier, B. (2012). Pure versus guided mirror exposure to reduce body dissatisfaction: A preliminary study with university women. *Body Image, 9*(2), 285-288. doi: 0.1016/j.bodyim.2011.12.001

Mountford, V., & Waller, G. (2006). Using imagery in cognitive-behavioral treatment for eating disorders: Tackling the restrictive mode. *International Journal of Eating Disorders, 39*(7), 533-543. doi: 10.1002/eat.20329

Murphy, R., Straebler, S., Cooper, Z., & Fairburn, C. (2010). Cognitive behavioural therapy for eating disorders. *Psychiatric Clinics of North America, 33*(3), 611-627. doi: 10.1016/j.psc.2010.04.004

National Institute for Health and Care Excellence. (2017). Eating disorders: Recognition and treatment. NICE guideline 69. Retrieved from https://www.nice.org.uk/guidance/ng69

Newns, K., Bell, L., & Thomas, S. (2003). The impact of a self-esteem group for people with eating disorders: An uncontrolled study. *Clinical Psychology and Psychotherapy, 10*(1), 64-68. doi: 10.1002/cpp.352

Nezlek, J. B., & Plesko, R. M. (2001). Day-to-day relationships among self-concept clarity, self-esteem, daily events, and mood. *Personality and Social Psychology Bulletin, 27*(2), 201-211. doi: 10.1177/0146167201272006

Ohanian, V. (2002). Imagery rescripting within cognitive behavior therapy for bulimia nervosa: An illustrative case report. *International Journal of Eating Disorders, 31*(3), 352-357. doi: 10.1002/eat.10044

Papioannou, D., Sutton, A., Carroll, C., Booth, A., & Wong, R. (2010). Literature searching for social science systematic reviews: Consideration of a range of search techniques. *Health Information and Libraries Journal, 27*(2), 114-122. doi: 10.1111/j.1471-1842.2009.00863.x

Pearson, D. G., Deeprose, C., Wallace-Hadrill, S. M. A., Burnett Heyes, S., & Holmes, E. A. (2013). Assessing mental imagery in clinical psychology: A review of imagery measures and a guiding framework. *Clinical Psychology Review, 33*(1), 1-23. doi: 10.1016/j.cpr.2012.09.001

Peck, L., & Lightsey, O. (2008). The eating disorders continuum, self-esteem and perfectionism. *Journal of Counseling and Development, 86*, 184-192. doi: 10.1002/j.1556-6678.2008.tb00496.x

Renner, F., Ji, J. L., Pictet, A., Holmes, E. A., & Blackwell, S. E. (2017). Effects of engaging in repeated mental imagery of future positive events on behavioural activation in individuals with major depressive disorder. *Cognitive Therapy and Research, 41*(3), 369-380. doi: 10.1007/s10608-016-9776-y

Richardson, A. (1977). Verbalizer-visualizer: A cognitive style dimension. *Journal of Mental Imagery, 1*(1), 109-125.

Rubin, D. C. (2006). The basic-systems model of episodic memory. *Perspectives on Psychological Science, 1*, 277–311. doi:10.1111/j.1745-6916.2006.00017.x

Schmidt, J., & Martin, A. (2016). Neurofeedback against binge eating: A randomized controlled trial in a female subclinical threshold sample. *European Eating Disorders Review, 24*(5), 406-416. doi: 10.1002/erv.2453

Shapiro, J., Pisetsky, E., Crenshaw, W., Spainhour, S., Hamer, R., Dymek-Valentine, M., & Bulik, C. (2008). Exploratory study to decrease postprandial anxiety: Just relax! *International Journal of Eating Disorders, 41*(8), 728-733. doi: 10.1002/eat.20552

Sheffield, A., Waller, G., Emanueli, F., Murray, J., & Meyer, C. (2009). Do schema processes mediate links between parenting and eating pathology? *European Eating Disorders Review, 17*(4), 290-300. doi: 1.0.1002/erv.922

Shisslak, C. M., Crago, M., & Estes, L. S. (1995). The spectrum of eating disturbances. *International Journal of Eating Disorders, 18*(3), 202-219.

Singer, J. A., & Salovey, P. (1993). *The remembered self: Emotion and memory in personality*. New York, NY: Free Press.

Somerville, K., & Cooper, M. (2007). Using imagery to identify and characterise core beliefs in women with bulimia nervosa, dieting and non-dieting women. *Eating Behaviors, 8*(4), 450-456. doi: 10.1016/j.eatbeh.2006.12.004

Somerville, K., Cooper, M., & Hackmann, A. (2007). Spontaneous imagery in women with bulimia nervosa: An investigation into content, characteristics and links to childhood memories. *Journal of Behavior Therapy and Experimental Psychiatry, 38*(4), 435-446. doi: 10.1016/j.jbtep.2007.09.003

Stice, E. (2002). Risk and maintenance factors for eating pathology: A meta-analytic review. *Psychological Bulletin, 128,* 825-48. doi: 10.1037//0033-2909.128.5.825

Stopa, L. (2009). Imagery and the threatened self: An introduction. In L. Stopa (Ed.), *Imagery and the threatened self: Perspectives on mental imagery and the self in cognitive therapy*. (pp. 1-14). New York., NY: Routledge/Taylor & Francis Group.

Stopa, L., Brown, M. A., & Hirsch, C. R. (2011). Seeing myself and knowing myself: Images and self-representation in social anxiety. Unpublished manuscript.

Stopa, L., Brown, M. A., & Hirsch, C. R. (2012) The effects of repeated imagery practice on self-concept, anxiety and performance in socially anxious participants *Journal of Experimental Psychopathology,* 3(2), pp. 223-242. doi: 10.5127/jep.021511

Swift, W. J., & Letven, R. (1984). Bulimia and the basic fauk: A psychoanalytic interpretation of the binging-vomiting syndrome. *Journal of Child Psychiatry, 23,* 1-6.

Tatham, M. (2011). The role of imagery-based techniques in cognitive behavioural therapy for adults with eating disorders. *Clinical Psychology Review, 31*(7), 1101-1109. doi: 10.1016/j.cpr.2011.06.008

Tatham, M., Turner, H., Mountford, V., Tritt, A., Dyas, R., & Waller, G. (2015). Development, psychometric properties and preliminary clinical validation of a brief, session-by-session measure of eating disorder cognitions and behaviours: The ED-15. *International Journal of Eating Disorders, 48,* 1005-1015. doi: 10.1002/eat.22430

Thomas, B. B., Ciliska, D., Dobbins, M., & Micucci, S. (2004). A process for systematically reviewing the literature: Providing the research evidence for public

health nursing interventions. *Worldviews on Evidence-Based Nursing, 1*(3), 176-184. doi: 10.1111/j.1524-475X.2004.04006.x

Thomas, J. J., Vartanian, L. R., & Brownell, K. D. (2009). The relationship between eating disorder not otherwise specified (EDNOS) and officially recognized eating disorders: Meta-analysis and implications for DSM. *Psychology Bulletin, 135*(3), 407-433. doi: 10.1037/a0015326

Vanderlinden, J., Kamphuis, J. H., Slagmolen, C., Wigboldus, D., Pieters, G., & Probst, M. (2009). Be kind to your eating disorder patients: The impact of positive and negative feedback on the explicit and implicit self-esteem of female patients with eating disorders. *Eating and Weight Disorders-Studies on Anorexia, Bulimia and Obesity, 14*(4), 237-242. doi: 10.1007/BF03325124

Vitousek, K. B., & Hollon, S. B. (1990). The investigation of schematic content and processing eating disorders. *Cognitive Therapy and Research, 14*(2), 191-214. doi: 10.1007/BF01176209

Waller, G., Kennerley, H., & Ohanian, V. (2007). Schema-focused cognitive-behavioural therapy for eating disorders. In L. P. Riso, P. L. du Toit, D. J. Stein & J. E. Young (Eds.), *Cognitive schemas and core beliefs in psychological problems: A scientist-practitioner guide*. (pp. 139-175). Washington, DC: American Psychological Association.

Waller, G., Tatham, M., Turner, H., Mountford, V., Bennetts, A., Bramwell, K.,…Ingram, L. (2018). A 10-session cognitive behavioural therapy (CBT-T) for eating disorders: Outcomes from a case series of nonunderweight adult patients. *International Journal of Eating Disorders, 0,* 1-8. doi: 10.1002/eat.22837

Warren, C., Crowley, M., Olivardia, R., & Schoen, A. (2008). Treating patients with eating disorders: An examination of treatment providers' experiences. *Eating Disorders: The Journal of Treatment and Prevention, 17*(1), 27-45. doi: 10.1080/10640260802570098

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54*(6), 1063-1070. doi: 10.1037/0022-3514.54.6.1063

Wild, J., & Clark, D. (2011). Imagery rescripting of early traumatic memories in social phobia. *Cognitive and behavioral practice, 18*(4), 433-443. doi: 10.1016/j.cbpra.2011.03.002

Wild, J., Hackmann A., & Clark D. M. (2007). When the present visits the past: Updating traumatic memories in social phobia. *Journal of Behavior Therapy and Experimental Psychiatry, 38,* 386–401. doi: 10.1016/j.jbtep.2007.07.003

Wild, J., Hackmann, A., & Clark, D. M. (2008). Rescripting early memories linked to negative images in social phobia: A pilot study. *Behavior Therapy, 39,* 47-56. doi: 10.1016/j.beth.2007.04.003

Wonderlich, S. A., Engel, S. G., Peterson, C. B., Robinson, M. D., Crosby, R. D., Mitchell, J. E.,…Simonich, H. K. (2008). Examining the conceptual model of integrative cognitive-affective therapy for BN: Two assessment studies. *International Journal of Eating Disorders, 41*(8), 748-754.

Young, J. E., Klosko, J. S., & Weishaar, M. E. (2003). *Schema therapy: A practitioner's guide*. New York, NY: Guilford Press.