The role of imagery rescripting as an adjunct treatment for disordered eating

by

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ABSTRACT

Imagery rescripting is a treatment adjunct that seeks to rescript a negative memory or image in order to reduce the current impact of the negative emotional valence of that memory. Research suggests that imagery rescripting can be helpful in reducing symptoms in a variety of mental disorders such as posttraumatic stress disorder and social anxiety disorder. To date, research of the use of imagery rescripting in treating disordered eating has been scarce. Hence, this research aims to fill the gap in the literature by examining the efficacy of using imagery rescripting in treating disordered eating.

Study 1 (N = 130) and *2* (N = 100) were conducted among young females at risk of disordered eating. *Study 1* aimed to understand whether there are differential benefits to using general (i.e., rescripting a general negative event that is not specific to disordered eating) versus body (i.e., rescripting a negative event specific to one's perception of weight/shape) imagery rescripting. A comparison of general versus body imagery rescripting with psychoeducation and control suggested that both imagery rescripting approaches helped reduced disordered eating and increase body image flexibility. However, their respective effect size changes were smaller than psychoeducation. Additionally, the general imagery rescripting helped reduce dysfunctional attitudes, whereas body imagery rescripting helped increase self-compassion and decrease fear of self-compassion.

Study 2 then investigated whether combining both psychoeducation and body imagery rescripting can lead to a larger effect than when approaches were used alone (COVID-19 and associated lockdowns occurred during the conduct of this study). Findings from *Study 2* suggest that combination of the approaches did not necessarily reduce both disordered eating and self-compassion. However, the combination approach did help improve body image flexibility during COVID.

Study 3 (*N* = 12) was a pilot study conducted among day patients with an eating disorder to investigate the feasibility of using imagery rescripting as an adjunct to treatment as usual. Participants either received treatment as usual or treatment as usual plus imagery rescripting provided during first week of treatment. Results suggest that imagery rescripting seemed to have slowed recovery for patients in terms of their readiness, depression, stress, psychological distress, disordered eating and body image flexibility. However, those who received imagery rescripting demonstrated significant reduction in dysfunctional attitudes compared to those in treatment as usual.

Finally, *Study 4* (*N* = 121) aims to understand whom psychoeducation or imagery rescripting benefits (i.e., moderator analyses). Results suggest that if the treatment goal is to reduce disordered eating, psychoeducation is more likely to benefit those who had higher body image flexibility at baseline, whereas imagery rescripting is more likely to benefit those who reported higher self-compassion or lower body image flexibility at baseline. If the treatment goal is to enhance self-compassion, body image rescripting is the preferred approach compared to psychoeducation regardless of moderator levels.

In summary, findings from this thesis suggest imagery rescripting has promise in reducing disordered eating and enhancing self-compassion among those at risk of disordered eating. More randomized controlled trials are needed to examine the efficacy of imagery rescripting as a treatment adjunct in a clinical setting, developing a better understanding of how this can best work for people being treated for an eating disorder.

DECLARATION

I certify that this thesis:

1. does not incorporate without acknowledgment any material previously submitted for a degree or diploma in any university; and

2. to the best of my knowledge and belief, does not contain any material previously published or written by another person except where due reference is made in the text.

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LIST OF STUDENT'S PUBLICATIONS SUBMITTED/PUBLISHED DURING CANDIDATURE

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Zhou, Y., & Wade, T. D. (2021a). Face-to-face imagery rescripting as a treatment adjunct for day patients with an eating disorder: A randomised controlled pilot study. *Journal of Behavioral and Cognitive Therapy*, *31*(1), 37–45. https://doi.org/10.1016/j.jbct.2020.11.005

Zhou, Y., & Wade, T. D. (2021b). The impact of COVID -19 on body-dissatisfied female university students. *International Journal of Eating Disorders*, *54*(7), 1283–1288. https://doi.org/10.1002/eat.23521

Zhou, Y., & Wade, T. D. (submitted and rejected). What makes body imagery rescripting effective in reducing disordered eating and increasing self-compassion: Moderator analyses among young women at risk of an eating disorder. *Behavioural Research and Therapy*.

ACRONYMS USED THROUGHOUT DISSERTATION

Acronym	Meaning
AN	Anorexia Nervosa
BED	Binge Eating Disorder
BIAAQ	Body Image Acceptance and Action Questionnaire
BISS	Body Image States Scale
BMI	Body Mass Index
BN	Bulimia Nervosa
CI	Confidence Interval
CIA	Clinical Impact Assessment
DAS-SF1	Dysfunctional Attitudes Scales – Short Form 1
EDEQ	Eating Disorder Examination Questionnaire
EDs	Eating Disorders
ES	Effect size
IR	Imagery rescripting
NA	Negative affect
OSFED	Other Specified Feeding or Eating Disorder
PANAS	Positive and Negative Affect Schedule
SCS	Self-compassion Scale
TAU	Treatment as Usual
WCS	Weight Concerns Scale

Please note: Referencing follows the **APA (7th Edition) Referencing Guide** published in 2020.

CHAPTER 1: OVERVIEW, AIMS, AND STRUCTURE

Overview

Lauren Corena, the daughter of Mario Corena whom supported this research, took her own life at the age of 26 after years of battling an eating disorder (ED) and other comorbidities (DiGirolamo, 2021). She is one of the many Australians whose lives have been impacted by eating disorders. According to the National Eating Disorders Collaboration (NEDC), eating disorders together with disordered eating behaviours affect over 16% of the Australian population, around 4 million people (*Eating Disorders in Australia*, n.d.). The research described in this thesis aspires to improve the mental health and well-being of young females at risk of disordered eating through the investigation of a self-compassion focused treatment adjunct, imagery rescripting, across three randomized controlled trials. While this research focuses exclusively on females, it is acknowledged that a considerable number of males or other sexually/gender diverse people experience disordered eating, and that this also an important area of enquiry.

Eating disorder prevalence and consequences

A systematic literature review revealed that the lifetime prevalence of any eating disorder for females was 8.4%; 1.4% for Anorexia Nervosa (AN), 1.9% for Bulimia Nervosa (BN), 2.8% for Binge Eating Disorder and, 4.3% for Eating Disorders Not Otherwise Specified (EDNOS, now called Other Specified Feeding and Eating Disorder, OSFED) (Galmiche et al., 2019). The review also concluded that the point prevalence of in Australian population increased two-fold from 1998 to 2008. Recovery from an ED is possible, but in some cases can be slow. For AN, a 30-year follow-up study suggest that the mean duration of all eating disorder episodes was 10.2 years (Dobrescu et al., 2019). Over the lapse of 30 years in this study, two thirds of the people achieved full recovery, defined as individuals who have been free of all criterion symptoms for a minimum of 6 months. In the Global Burden of

Disease Study (Santomauro et al., 2021), using the metric of disability-adjusted life-year (DALY) to measure burden, it was estimated that EDs (including EDNOS or OSFED) in general accounted for 6.6 million DALY, of which the majority was accounted for by OSFED.

The relationship between disordered eating and eating disorders

While EDNOS, or now OSFED, used to be considered the "sub-clinical" or "sub-threshold" EDs, the research indicated that these cases were associated with significant impairment and high prevalence rate. A meta-analysis suggested that EDNOS does not differ significantly in terms of eating pathology or general psychopathology compared to that of AN and BED (Thomas et al., 2009). Although people with BN exhibit higher levels of psychopathology than people with EDNOS, moderator analyses of this latter group revealed where all criteria for BN except binge frequency were met, there was no significant difference in psychopathology from full syndrome cases. Therefore, as there are no real distinctions in terms of impairment between "sub-threshold" eating disorders, adopting a continuum in viewing eating and general pathology may be more meaningful. To this end, the research reported in this thesis will focus on disordered eating as a continuum, which includes disordered eating behaviours and body image concerns, rather than a focus on deriving specific diagnoses *per se*.

Potent risk factors for disordered eating

Previously research has consistently cited sex and weight/shape concerns as one of the most potent factors in terms of risk of developing an eating disorder (Jacobi et al., 2004a; Jacobi et al., 2011). Alarming statistics showed that more than 80% of females struggle with poor body image and body dissatisfaction in Australia (Mond et al., 2013). Further, among Australian youth specifically, body image is consistently identified as one of the top three mental health concerns by Mission Australia surveys (Tiller et al., 2020, p. 5).

In addition to weight concerns, a variety of other risk factors for developing an eating disorder have been identified in the literature. One important factor identified in recent research was receiving critical comments about eating from teacher/coach/siblings in addition to a history of depression (Jacobi et al., 2011). Using a twin study, Fairweather-Schmidt and Wade (2015) showed that weight-related peer teasing over adolescence was a significant non-shared environmental factor that triggered genetic risk of developing disordered eating.

Imagery as a pathway to improving body image and disordered eating

As both body image and memories of critical comments and teasing are highly imagery based, they suggest a common visual/imagery pathway to addressing them. Research has consistently shown that imagery is more powerful than verbal processing in eliciting emotions (see Holmes & Mathews, 2010, for a review). Manipulating imagery therapeutically (e.g., generating new positive imagery to combat the emotional impact of a problematic memory) has produced positive outcomes in other disorders such as Social Anxiety Disorder and Post Traumatic Stress Disorder (reviewed in Hackmann & Holmes, 2004). The usefulness of imagery techniques for alleviating disordered eating are not well understood, however, despite their relevance.

Imagery Rescripting

Imagery Rescripting (IR) is one intervention that harnesses visualisation to improve body image or change the emotional impact of weight-related teasing and critical comments. Typically, the focus is on increasing self-compassion as an important pathway to symptom alleviation. IR is typically a treatment adjunct to Cognitive Behavioural Therapy (CBT). It reconstructs a negative mental imagery associated with negative memories by rescripting the memory such that an older, wiser, adult self is present in the negative memory to help the younger self in meeting previously unmet emotional needs.

Research has shown that IR is effective in enhancing treatment for various mental health problems, including trauma related to childhood sexual abuse, social anxiety disorder, post-traumatic stress disorder, depression, and personality disorders. As summarised in detail in Chapter 2, research on IR for disordered eating was in its nascent stage at the commencement of this thesis, with only 3 studies existing. Two of these studies were conducted in people with EDs, in both cases BN (Cooper et al., 2007; Ohanian, 2002), with memories not related to the body or eating specifically but of relevance of negative core beliefs. One study (Pennesi & Wade, 2018) used IR to rescript body-related negative memories with people that are experiencing disordered eating. Many questions remain unanswered about the use of IR with body image and disordered eating, and therefore the overall aim of the current thesis is to investigate the effectiveness of IR in increasing self-compassion and alleviating disordered eating.

Specific Aims

The thesis topic will contribute to the small body of research by addressing the following specific aims:

(1) Investigate whether IR is more powerful with young females at risk of disordered eating if focused on past events related to the body or more general traumatic events,
(2) Investigate the impact of combining IR with psycho-education in young females at risk of disordered eating,
(3) Investigate whether use of IR as an adjunct to treatment as usual (day hospital settings) significantly improves outcomes,
(4) Investigate under what conditions IR can be helpful or effective for young females at risk of disordered eating.

Structure

Chapter 2 will provide a literature review, including further information about EDs and disordered eating, the current state of mental imagery research, IR as a commonly used therapeutic imagery technique and its suitability for EDs and disordered eating.

Chapter 3 will introduce all the measures that were used in the studies, and provide information about their psychometric properties, to prevent repetition in succeeding chapters.

Chapter 4 will introduce the first study that was conducted to investigate the differential effectiveness of the two IR approaches for reducing disordered eating – general IR (i.e., rescripting memories not related to body/appearance such as being reprimanded by a parent for not getting good grades) versus body IR (i.e., rescripting memories specific to body/appearance such as being teased about weight or appearance), compared to psychoeducation and a control condition. This work was conducted among young females at risk of developing an eating disorder. Parts of this research have been published (Zhou et al., 2020) and the published work is presented in Appendix A. This study found that while both types of IR decreased disordered eating and improved body image flexibility compared to control, their effects were not as strong as a psychoeducation approach. However, the impact of psychoeducation was limited as it did not enhance self-compassion or reduce dysfunctional attitudes, as was observed with the IR interventions.

Chapter 5 will introduce the third study investigating the effectiveness of combining psychoeducation and body IR approaches among young females at risk of disordered eating. This study was informed by the findings from Study 1 that psychoeducation produced greater effect sizes change in disordered eating specific areas, whereas IR enacted change in other non-disordered eating specific areas such as dysfunctional attitudes and self-compassion. COVID-19 occurred during the conduct of this study, which ended up significantly impacting our pattern of results. Using a design of convenience, we compared participants who entered the trial pre- and during COVID and found that there was a significant increase in weight

concerns, global eating psychopathology, state negative affect and body image dissatisfaction of participants entering the trial. These results have ben published (Zhou & Wade, 2021b) and the publication is presented in Appendix C. Although combining IR and psychoeducation seemed to be helpful in increasing participants' self-compassion pre-COVID, this therapeutic effect disappeared during COVID. However, the combination group still resulted in an increase in participants' body image acceptance during COVID. Given the main effect of COVID on the results, this study was not adequately powered to make strong conclusions.

Chapter 6 will introduce the second study, a randomised controlled pilot investigating the effectiveness of body IR, this time among day patients with EDs. Body IR, not general IR, was selected for its targeted effect on self-compassion as research suggested that those who scored higher on self-compassion at baseline tend to respond better to treatment (Kelly et al., 2013a). We found that introducing IRs too early (the first week of the program) seemed to have slowed patients' recovery. Parts of this research have been published (Zhou & Wade, 2021a) and the published work is presented in Appendix B.

Chapter 7 will introduce the final study in this thesis, which analyzed the optimal conditions where IR or psychoeducation were most effective in reducing disordered eating or increasing self-compassion. This study reflects a "personalised medicine" approach to treatment, to try to understand which approach suits which people best. Hence, we wanted to understand the specific moderators that impact the effectiveness of IR in this study. We found that psychoeducation was effective in reducing disordered eating among those who have high body image flexibility, where as IR was effective among those who have low body image flexibility and high self-compassion.

Finally, **Chapter 8** will provide a synthesis and integration of all the findings stemming from this research. Limitations and future directions are also discussed in of the context of the current findings.

A Note on Structure and Presentation of the Dissertation

All studies presented in this thesis have been published or submitted to peer-reviewed journals. Repetition of content, while minimised, is required for justification of the aims of the studies described within **Chapters 4 to 7**. Discussion sections for the aforementioned chapters will be focused on the immediate results with a greater focus on integrating the results and their meaning, and implications for future research, in **Chapter 8**. All Tables and Figures can be found within the main body of each Chapter prior to the reference section. There is just one reference list for the entire thesis, placed after Chapter 8, and appendices follow the references

CHAPTER 2: INTRODUCTION AND LITERATURE REVIEW

Eating Disorders: An overview

Eating disorders are serious mental illnesses that affect people of all size, shape, age, gender, and ethnicity. A core feature of many eating disorders is the disturbance in the experience of body shape or weight, such that persistent negative thoughts or feelings are generated, which can translate to behavioural strategies to influence shape or weight such as restricting food intake or implementing strict food rules (e.g., calories counting, eliminating certain food groups such as carbohydrates), vomiting, using laxatives or diuretics, and/or excessive exercise. For some people, objective binge episodes or low weight result from these strategies. Commonly, behaviours such as body checking (e.g., frequent weighing, study oneself in the mirror excessively), body comparison (e.g., comparing own body with people on the street), and avoidance (e.g., avoid looking at oneself in the mirror), accompany the disordered eating. The preoccupation about body weight and shape concerns, the physical, cognitive, and emotional impact of starvation, malnutrition, and/or bingeing and purging behaviours, can result in extreme distress for the person experiencing an eating disorder.

Types of eating disorders

The fifth edition of the Diagnostic and Statistical Manual of Mental Disorder (DSM-5; American Psychiatric Association, 2013) describes the following types of feeding and eating disorders: pica, rumination disorder, avoidance/restrictive food intake disorder, anorexia nervosa, bulimia nervosa, binge-eating disorder, other specified feeding or eating disorder (OSFED). Pica involves eating non-nutritive, non-food substance. Ruminative disorder involves regurgitation of food. Avoidance/restrictive food intake disorder (ARFID) involves restricting food intake due to lack of interest in food, avoidance based on sensory characteristics of food, concern about aversive consequences of eating, not related to control

of weight or shape. Pica, ruminative disorder, and ARFID are beyond the scope of the current research, as these disorders do not typically have an element of weight and shape concern. The eating disorders that do typically include some type of weight and shape concern, and are the focus of the thesis, are described below.

Anorexia Nervosa (AN) involves restrictive food intake accompanied by an intense fear of weight gain or becoming fat, which results in a significantly low body weight in the context of age, sex, developmental trajectory, and physical health. There are two subtypes of AN that describe symptom presentation in the last three months. The first is restricting (i.e., AN-R; weight loss primarily attained through dieting, fasting and/or excessive exercise) and the second is binge-eating/purging type (AN-B/P; i.e., recurrent of binge-eating or purging behaviours and remain low weight).

Bulimia Nervosa (BN) involves recurrent episodes of binge eating accompanied by compensatory behaviours to control body weight and shape, when the individual is not within the low weight range (otherwise, a diagnosis of AN-B/P would be warranted). Compensatory behaviours can include purging (self-induced vomiting, use of laxatives and/or diuretics, under-dosing of insulin in the presence of Type 1 diabetes, and use of other medications), fasting and excessive exercise. Individuals with BN are often, but not always, within the normal weight or overweight range (body mass index [BMI] >18.5 and < 30).

Binge eating disorder (BED) involves recurrent episodes of binge-eating without the presence of compensatory behaviours to control body weight and shape. A binge eating episode may commonly be triggered by negative affect, interpersonal stressors, negative feelings towards body shape or weight, dietary restraint and boredom (American Psychiatric Association, 2013). The binge eating results in marked distress. Research suggest that BN differs from BED in that people with BN experience significantly higher Restraint and Drive for Thinness measured by the Eating Disorder Inventory (Garner, 2004), compared to those

with BED (Jordan et al., 2013). Further, higher Restraint and lower BMI distinguish BN where purging is not present (i.e., compensatory behaviours include fasting and/or excessive exercise only) from BED (Jordan et al., 2013).

Other Specified Feeding and Eating Disorders describe those whose symptoms but do not meet the full criteria for one of the eating disorders previously described. For example, atypical AN where all criteria of AN are met except the person has not entered the low weight range despite a substantial loss of weight; BN or BED where behaviours are of low frequency (symptoms occur less than once a week) or less duration than a 3-month period.

Transdiagnostic nature of eating disorders

For both AN and BN, a key diagnostic criterion includes disturbance in the way in which one's body weight or shape is experienced, including undue influence of body weight or shape on self-evaluation. That is, while others may base their self-esteem on a variety of aspects in life such as relationships, work, hobbies, parenting (Fairburn, 2008), individuals with an eating disorder may place a significant amount of emphasis on body weight/shape in terms of how they evaluate themselves which can leave little to no room for other areas to influence self-evaluation. For instance, for a person with AN, ability to control weight may be viewed as an "impressive achievement" and reflecting "extraordinary self-discipline" (American Psychiatric Association, 2013, p.340).

While body image disturbance is not currently included as part of the diagnosis of BED, evidence suggest that individuals with BED can experience similar levels of overvaluation of weight and shape as people with AN and BN (e.g., scoring a 5 or 6 on the EDE-Q questions assessing the importance of weight and shape; Mond et al., 2006). In fact, network analysis research suggest that overvaluation of weight and shape is of highest centrality to BED i.e., the symptom that is most central to the disorder or in other words, the core psychopathology (Wang et al., 2018). Although some research suggests that people with

BN tend to experience greater overvaluation and preoccupation of weight and shape than people with BED (Grilo et al., 2019), people with BED who experience higher over-evaluation of body weight and shape display more severe eating psychopathology than those with lower levels of over-evaluation (Grilo et al., 2008; Grilo et al., 2009; Grilo et al., 2010; Mond et al., 2006) and in some cases more severe those with BN (Coffino et al., 2019). This evidence suggested that overvaluation can be a helpful specifier for BED to inform treatment but not necessarily as a criterion for diagnosis, as it will rule out people who experience clinically significant distress associated with binge eating without high levels of over-evaluation (e.g., Grilo et al., 2008). Nonetheless, across different eating disorder diagnostic groups, overvaluation of weight and shape is common, which reflect the transdiagnostic nature of eating disorders (Fairburn et al., 2003a). In fact, some preliminary evidence suggest that overvaluation of shape and weight can be used as a transdiagnostic severity index (Gianini, et al., 2017).

Unsurprisingly, given the number of features common across eating disorders, movements between, or crossover among eating disorder diagnoses, often occur (Ackard et al., 2011; Castellini et al., 2011; Hilbert et al., 2014; Milos et al., 2005). For instance, one prospective study (Milos et al., 2005) showed that two thirds of participants (excluding those who no longer had an eating disorder at the time of assessment, 31%) received a different diagnosis over three standardised assessments over a 30-month period (e.g., 20% of cases changed from AN to BN; 9% vice versa, and 37% changed from an AN or BN to EDNOS, now OSFED).

Etiology and risk factors

Various models have been postulated to account for the most important risk factors for eating disorders, and to describe how these might work together. A systematic review revealed that only ten (out of 54) of these models have been supported by empirical evidence

and developed into interventions (Pennesi & Wade, 2016). The common constructs across these evidence-based models were: preoccupation with weight and shape (e.g., weight and shape concerns, thin body preoccupation, body dissatisfaction), self-esteem deficits, emotional regulation difficulties, interpersonal issues, negative affect, thin-ideal internalization, external pressure, perfectionism, cognitive factors (e.g., negative self-belief), dieting, self-surveillance (i.e., poor interoceptive awareness), self-objectivation (i.e., body surveillance), BMI, social comparison, social support, developmental factors, and biogenetic predisposition. These constructs were hence indicative of the "core putative risk factors" (p.184) responsible for the development of disordered eating pathology. Among these risk factors, preoccupation with weight and shape and negative affect have been suggested as the two single most prominent risk factors (Jacobi & Fittig, 2010; Jacobi et al., 2011).

Further, there are distinctive risk factors associated with specific eating disorders. For instance, Hilbert et al.'s study (2014) revealed that the risk factors for AN and BED were disparate. AN was associated with higher levels of perfectionism, while BED was associated with higher levels of conduct problems, substance abuse, severe childhood obesity, and family overeating. Meanwhile, however, risk factors for BN tend to be shared by individuals with either AN or BED. For example, significantly poorer set-shifting (i.e., ability to think flexibly) and central coherence (i.e., ability to think in terms of bigger picture) are observed in people with AN and BN compared to controls, with no difference between the two diagnostic groups, and no differences observed between BED and controls (Keegan et al., 2020). This may explain the fluidity in terms of diagnostic movements that were observed between AN to BN (Bulik et al., 1997), AN/BN to OSFED, BN to BED but not AN and BED (Milos et al., 2005).

Similarly, Treasure et al. (2020) summarized the biological, psychological, psychosocial and behavioural factors that contribute to the etiology of either restrictive-type

or bulimic-spectrum eating disorders. Biological factors included genetic predisposition, sex, and metabolic vulnerability. Psychological factors included body image disturbance and alexithymia (i.e., inability to recognize one's emotions). Psychosocial factors included parental eating problems, peer pressure, exposure to trauma, culture, and thin idealisation. Behavioural factors included weight control behaviours, overconcern with BMI, coping by avoidance or perfectionism, social isolation, impaired physical and mental quality of life. Treasure suggested that unique aetiology is determined largely by psychological factors, where the restrictive type of eating disorders is associated with personality traits such as rigidity, attention to detail, ability to delay reward, intolerance of uncertainty and mistakes, and perfectionism, whereas bulimic types of eating disorders are associated with attention-deficit hyperactivity disorder traits such as impulsivity and difficulty paying attention, inability to delay reward, and higher levels of childhood adversity.

Treatments for eating disorders

A brief summary of current treatment principles and recommendations that were commonly suggested by various guidelines (Hilbert et al., 2017) is presented in **Table 1.** While treatments may differ, core principles of treatment can be identified (Heruc et al., 2020). The Australia & New Zealand Academy for Eating Disorders (ANZAED) identified eight eating disorder treatment principles that emphasize early intervention (not limited by strict diagnostic criteria), coordination of services (e.g., from inpatient to outpatient, from adolescent services to adult services), evidence-based treatment, involvement of significant others, personalized treatment (e.g., conducting session-by-session evaluation, using a strength-focused approach), psychoeducation and multidisciplinary care with a skilled workforce (see Heruc et al., 2020, p. 5). Specific recommendations were provided for each eating disorder. For instance, for AN, weight restoration is key, psychoeducation about starvation effects and reversing starvation by nutritional rehabilitation needs to be provided

and clear criteria is needed for moving to more intensive treatment. For both BN and BED, an explanation that psychological treatments have limited effect on body weight needs to be provided. Specific to BN, patients need to be explained to that dieting increases the chance of binge eating. For all eating disorders, it was recommended that medication is not to be offered as a sole approach.

Table 1. A brief summary of current treatment recommendation for eating disorders.

Diagnosis	Treatment recommendations
Anorexia nervosa	**For adults:** 1. Individual eating-disorder-focused/enhanced cognitive behavioural therapy (CBT-ED) 2. Maudsley Anorexia Nervosa Treatment for Adults (MANTRA) 3. Specialist supportive clinical management (SSCM) 4. Eating-disorder-focused focal psychodynamic therapy (FPT) as an alternative option **For children and young people:** 1. Family therapy (FT-AN) 2. Individual CBT-ED 3. Adolescent-focused psychotherapy for AN (AFP-AN) as an alternative option
Bulimia nervosa	**For adults:** 1. CBT guided self-help 2. Individual CBT-ED **For children and young people:** 1. Family-based therapy 2. Individual CBT-ED
Binge eating disorder	1. CBT guided self-help programme 2. Group/individual CBT-ED
OSFED	Use "the treatments for the eating disorder it mostly closely resembles" (*Eating Disorders: Recognition and Treatment*, 2017, p. 23).

Effectiveness of current existing treatments. A meta-analysis examining trials that compared CBT with other forms of active treatments (e.g., other psychotherapy or medications) or inactive conditions (e.g., waitlist or treatment as usual) suggested that

therapist-led CBT is most efficacious treatment especially in BN and BED (Linardon et al., 2017). When examining AN, comparing various forms of therapy (e.g., cognitive remediation therapy, interpersonal psychotherapy, focal psychodynamic therapy), the meta-analysis revealed no differences among treatments in cognitive symptoms, at posttreatment, and follow-up (no studies in this meta-analysis included remission rates and binge/purge frequencies as outcome measures). Similarly, a randomized controlled trial (RCT) compared treatments for AN such as SSCM, MANTRA and CBT-E found that that all three treatments did not differ from each other in terms of creating clinically significant improvements in BMI, eating disorder psychopathology, general psychopathology or psychosocial impairment over the 12-month follow-up period (Byrne et al., 2017). Around 50% of participants achieved healthy weight, and 28% achieved remission as defined by Bardone-Cone et al. (2010). Furthermore, a network meta-analysis examining the comparative efficacy of outpatient treatments for adults with AN revealed that the treatments recommended by the 2017 National Institute of Health and Care Excellence (NICE) guidelines (i.e., SSCM, MANTRA, CBT-ED, and focal psychodynamic psychotherapy) did not significantly differ from expert-delivered treatment as usual in terms of change in BMI, clinical symptoms and drop-out (Solmi et al., 2021).

The current remission rates of existing eating disorder treatments, however, are not ideal, despite best efforts in developing these evidence-based treatment approaches. For instance, a meta-analytic review suggested that 60% of people with BN continue to experience core bulimic symptoms after treatment completion (Linardon & Wade, 2018). Another meta-analysis suggested that around 24% drop out of treatments irrespective of various definitions of dropout (e.g., failure to complete the entire treatment protocol, or failure to complete post treatment assessment; Linardon et al., 2018). Further, it is estimated

up to half of eating disorder patients relapse within 19 months after treatment cessation (Olmsted et al., 2005).

Predictors of treatment outcome. A review of predictors of treatment outcome found that baseline measures had variable predictive value, but that early response to treatment (e.g., changes in eating disorder symptoms over the first 4 to 8 sessions of outpatient treatment) was the most robust predictor of good outcome across diagnostic groups and treatment settings at end of treatment and follow-up (Vall & Wade, 2015). The strength of association between early change and treatment outcome in eating disorders has most recently been estimated at $r = 0.41$ (95% CI: 0.32–0.481), $p < .001$ (Chang et al., 2021). This phenomenon is observed in other forms of psychological distress, including major depression, where up to 80% of the decrease in severity of depression occurs by the fourth session of CBT (Ilardi & Craighead, 1994), and change in symptoms at this point predicts remission (Persons & Thomas, 2019).

Taking the sub-optimal outcomes of current treatments for eating disorders and the important predictive information of early change, it has been suggested that future research needs to evaluate use of augmentation therapies in the face of early non-response (Wade et al., 2020). Imagery rescripting of one such adjunct that may be helpful for people with disordered eating or eating disorders and is the focus of the current thesis and the remainder of this chapter.

The Current State of Mental Imagery Research

Overview

Mental imagery is a subjective mental representation of perceptual experiences. Although its visual modality is most discussed, mental imagery is in fact multisensory including body sensations, smell and sound. Common mental imagery includes, for instance, memories of past events or imagination of future events. Imagery can be processed by a core

component of our working memory labelled the visuospatial sketchpad (Baddeley, 2012). The vividness and impact of imagery can be modified when there is disruption of processing by the visuospatial sketchpad (Baddeley & Andrade, 2000). For example, eye-moment desensitization-reprocessing (EMDR) to treat post-traumatic stress disorder (PTSD), which involves the individual making saccadic eye-movements while imagining the traumatic event, is postulated to disrupt the visuospatial sketchpad and reduces the vividness of the distressing mental imagery. This leads to a decrease in distress associated with the imagery (Andrade et al., 1997). In this same way, rescripting images is hypothesised to "overwrite" the visuospatial sketchpad with an updated image.

Mental imagery and affect

Researchers suggest that imagery techniques are particularly promising in decreasing symptoms of mental disorders given evidence suggesting that imagery is more powerful than verbal processing in eliciting emotions (see Holmes & Mathews, 2010 for a review). The first and most relevant investigation directly comparing imagery and verbal processing was conducted in 1986, suggesting that imagery elicited higher heart rate than verbal rehearsal of the same material (Vrana et al., 1986), although this study was later criticized for failing to counterbalance conditions.

Holmes and Mathews (2005) showed that state anxiety increased significantly over time for those who imagined unpleasant events compared to those who verbally processed (i.e., listen to) the same materials, and the former group also reported materials being more emotional. Although this finding did not extend to benign materials (i.e., benign imagery did not reduce anxiety more than verbal processing), Holmes et al. (2006) later found that participants in imagery condition reported more positive affect than did those in the verbal condition. To rule out the confound that the effect on emotions was due to an additional mode of processing (i.e., imagery + verbal), Holmes et al. (2008) developed a new stimuli paradigm

such that perceptual (pictures) and verbal (words) cues were presented together, and participants were given instructions to combine the cues using either imagery or a verbal description (i.e., creating a sentence). This way, any observed effects on emotions could be attributed to the mode of integration (i.e., imagery versus verbal). They found that participants reported greater increase in anxiety in negative picture-word pairings, and greater reduction in anxiety in positive picture-word pairings using imagery than verbal instructions. They concluded imagery has a more powerful impact on emotions than verbal processing, in both positive (e.g., increasing anxiety in response to negative stimuli) and negative direction (e.g., reducing anxiety in response to positive stimuli). Other impacts of imagery on emotions compared with verbal processing have been reported, such as creating more positive interpretation bias, protecting against negative mood induction (Holmes et al., 2009), and simply being more realistic (Mathews et al., 2013). To date, it is consensus that imagery has a superior impact on emotions in various ways than verbal processing (Holmes & Mathews, 2010).

Mental imagery and Psychopathology

Research in recent years suggests the pivotal role of imagery in the maintenance of various types of psychopathology. For instance, people with post-traumatic stress disorder (PTSD) and anxiety-based disorders (e.g., social anxiety disorder, specific phobias) may experience disturbing, reoccurring, intrusive imagery of past trauma (flashbacks) or objects of fear respectively. People who suffer from substance dependencies may experience unwanted images of craving objects which maintain their dependencies. People with bipolar disorder or depression may encounter “flash forward” images of suicidal acts or past images related to distressing events. Imagery also occurs in a range of other disorders such as schizophrenia, obsessive compulsive disorder (OCD) and body dysmorphic disorder (Holmes & Mathews, 2010; Pearson et al., 2015).

Imagery Rescripting (IR)

Given the accumulation of findings linking imagery to affect, there has been increasing interest in incorporating the use of imagery in the treatment of psychological disorders which have traditionally primarily relied on verbal processing to achieve outcomes. In the recent literature imagery rescripting (IR) is the most common therapeutic technique incorporating imagery. In the Oxford Guide to Imagery in Cognitive Therapy (Hackmann et al., 2011), IR is described one of the methods to transform upsetting memories in order for patients to "experience and express emotions that were suppressed at the time, and imagine actions taken by the self and others that would have evoked a sense of mastery or compassion for the self" (p.126). In IR, the individual remembers a previous specific negative event and imagines a changed course and outcome of that event that is more desirable (Arntz, 2012). IR is typically an adjunct to cognitive behavioural therapy (CBT), although it is also a core component of Schema therapy in treating personality disorders (Giesen-Bloo et al., 2006; Young et al., 2006). In general, IR aims to reconstruct traumatic early memories, intrusive mental imagery, to enact positive changes in patients' emotions and behaviours, and consequently modify negative core beliefs. A recent meta-analysis (Morina et al., 2017) examined 19 clinical trials conducted with patients with PTSD, social anxiety disorder (SAD), body dysmorphic disorder, depression, BN, and obsessive-compulsive disorder, where IR consisted of at least 50% of the applied treatment. They found an overall large effect size between pre- and post- or follow up- treatment symptom reduction within IR conditions.

This meta-analysis is limited in its ability to make strong conclusions about the usefulness of IR. The within-group effect sizes are confounded with both other treatment components where these existed, and variables not related to treatment such as time. Additionally, out of these 19 trials being examined, only seven utilized a RCT design, of

which only two compared IR with an active control group. Neither of the two studies showed a significant superior effect of IR over the active control conditions. Thus, although IR is regarded as a promising treatment option in psychological disorders related to aversive memories (evidence is stronger for PTSD and SAD than other disorders), this research is in a nascent stage, as more evidence is needed to demonstrate its effect, especially by directly comparing IR to an active control in an RCT design, and being able to disentangle the effects of IR from other treatment effects.

Two types of ("type A") IRs

Holmes et al. (2007) wrote about two types of imagery rescripting: "type A" that is transforming a pre-exiting negative imagery into a more benign image (p.298) and "type B", that is generating a new positive image afresh to achieve therapeutic gains (e.g., by imaging giving a successful talk, or imagining receiving compassion from a fictional compassionate figure). The IR that this thesis discusses refers to "type A".

Within type A IR exists two streams, discussed and reviewed in Brockman and Calvert (2017). Specifically, they discussed the development of IR stemming from the work by Smucker et al. (1995) in treating PTSD, versus IR to modify general schematic beliefs that are more commonly presented in personality disorders (Arntz & Weertman, 1999; Young et al., 2006). Theoretically, Brockman and Calvert suggested that IR for PTSD, based on exposure techniques, was limited in the impact on changing the meaning of the traumatic events and shifting non-fear-based emotions (e.g., shame, guilt, anger) associated with the old meanings (Smucker et al., 1995). On the other hand, they conceptualise the second type of IR (Young et al., 2006, as used in Schema Therapy) as not aiming to reduce intrusion but to change the meaning of early maladaptive schemas that are thought to maintain personality disorder on an emotional level.

The two types of imagery rescripting differ in the level of specificity of the pre-existing negative mental imagery related to the psychological concerns in question. The first type of IR seeks to modify disorder-specific imagery (McEvoy et al., 2018; Smucker et al., 1995). For example, in social anxiety disorder, a specific scene of a past problematic social event (e.g., being bullied) might be conceptualized as more proximal to the current psychological concern in question, whereas a more general event (e.g., receiving little support during parents' separation), although relevant to the client, might be less pathogenetically specific. The second type of IR rescripts negative imagery related to a problematic belief not specific to the disorder (Brewin et al., 2009; Cooper et al., 2007; Ohanian, 2002), such as core beliefs related to unworthiness. To date, however, no empirical studies have specifically compared the two approaches, and whether one is more beneficial for any specific clinical groups.

Brockman and Calvert argued that two approaches differ from each other in both their rationale and techniques, but the choice of using which type of IR may not be disorder-specific and may depend on treatment goals and patients' readiness to master the negative imagery. In this thesis, we examined both disorder-specific experience (e.g., a negative body experience such as one being teased by peers about body weight and shape) and a general negative stressors (e.g., exposure to perfectionistic standards) as both are identified as risk factors for the development of an eating disorder. To date, however, no empirical studies have specifically compared which type of IR is more effective. Therefore, one of our primary aims was to directly compare the two types of IR with respect to impact on disordered eating.

IR steps and rationale

The IR approach we use in this thesis most closely resembles approaches used to treat social phobia (now social anxiety disorder) in Frets et al. (2014) and childhood sexual abuse described in Arntz and Weertman (1999). The two approaches are similar and contain three

steps: (1) reliving the problematic scene, (2) imagining the scene from another (adult) perspective, and (3) rescripting the scene by imagining a preferable course of events or outcomes.

The first step is usually to identity a “memory representation” which is “emotionally and thematically” relevant to the “current distressing felt sense” (Hackmann et al., 2011, p. 113). This step can help the client identify upsetting ‘hotspots’ or negative meanings associated with the memory in addition to putting the imagery back into the broader context (p.115). This process can prepare a client for cognitive processing as it may reveal information that one hasn’t attended to at the time which may be useful to help change the meaning of the memory. Some IR protocols asked participants to recall a negative memory up to the “worst part” was about to happen (e.g., Arntz et al., 2007; Krakow & Zadra, 2006). However, research suggest that IR that includes the most aversive scenes, as opposed to IR without, was associated with intrusions of reduced frequency and vividness (Dibbets & Arntz, 2015). Hence, IR used in this study asked participants to recall the entire negative event including the most aversive scene.

The second step of reliving the memory from another perspective continues the functions of the first step, that is, placing fragmented memories into perspective and offering opportunities for reflection. The observer perspective of autobiographical memory has been linked to reduced emotional impact compared to first-person imagery (discussed in Holmes et al., 2016). Seeing the memory from an adult self’s perspective may also aid the expression and validation of the emotions that were suppressed or experienced at the time, which better prepare the client for generating a genuine sense of self-compassion.

Finally, the rescripting step involves a client imagining their adult self going back into the problematic memory scene and offered support to their own younger self in the forms of protection, nurturance, or updated information. This step may further evoke a sense of

mastery of the imagery (e.g., more cognitive processing of negative meanings) and compassion for the self as one is directly experiencing compassion offered by one's older self at a distressing time. The core rationale of this technique is not exposure or habituation, but to change appraisals and affect associated with the memory (Hackmann et al., 2011). Further, as implicated in Brewin's retrieval competition hypothesis (Brewin, 2006; Brewin, 2015), a meaningful rescripted imagery may be able to compete with the original memory during memory retrieval which in turn changes our sense of self.

The Suitability of IR in Eating Disorders treatment/prevention

While the investigation of supplementing CBT with IR is still in a nascent stage, the efficacy of imagery techniques in eating disorders is even less well understood. At the time this thesis commenced, there were no RCTs examining the effect of IR in eating disorders. However, disturbing imagery is also highly relevant to disordered eating and eating disorders given that poor body image and past trauma are key risk factors for disordered eating (Brewerton, 2007; de Groot & Rodin, 1999; Jacobi et al., 2011). This presents three possible targets for IR.

The first is specific traumatic memories. Past traumas play an important role in the onset and maintenance of eating disorders. People with an eating disorder could benefit from the use of IR in its effect in reducing intrusive imagery associated with past traumas. In one study, 95% of the EDs patients reported having at least one potentially traumatic event in the past and around 23% of patients with AN and 25% of patients with BN meet diagnosis for PTSD (Tagay et al., 2013). Meta-analyses have suggested that childhood sexual abuse, the most documented trauma suffered by these patients, is a significant nonspecific risk factor for an eating disorder (Brewerton, 2007; Smolak & Murnen, 2002). Additionally, most patients with eating disorders reported traumatic events occurring before the onset of the eating disorder (Tagay et al., 2013; Welch et al., 1997). Prevalence rates of PTSD among patients

with eating disorders ranges from 4% - 52%. The presence of comorbid conditions accompanying the eating disorders (e.g., mood, anxiety, substance, use, and/or personality disorders) have been found to be associated with histories of traumatic experiences as well as PTSD (Brewerton, 2004; see Brewerton, 2007 for a review). Indeed, mental imagery adverse life events are common (e.g., Somerville et al., 2007) among people with eating disorders and evidence suggests that they may trigger bulimic behaviours in these patients. For instance, studies found that people with bulimia nervosa report experiencing visual images of adverse life experience prior to self-induce vomiting (Hinrichsen et al., 2007) or binge eating (Dugué et al., 2016; Villejo et al., 1997).

Second, addressing schematic beliefs by working with earlier generally aversive memories is also of relevance, given that research suggests core beliefs such as defectiveness, worthlessness, failure to achieve and abandonment are risk factors for eating disorders (see Jones et al., 2007 for a review). For example, a study showed that prior to vomiting, people with bulimia nervosa experienced negative thoughts related to defectiveness/shame, failure and social isolation core beliefs which associated with feelings such as shame and anxiety (Hinrichsen, et al., 2007). The transdiagnostic model of eating disorders suggests that factors such as core low self-esteem, clinical perfectionism, and mood intolerance are casual and maintaining factors of eating disorder pathology (Fairburn et al., 2003a). Researchers believe that exploring imagery may be a more effective method to identify and modify underlying beliefs than verbal techniques. Two studies illustrate use of IR approach in eating disorders. Ohanian (2002) presented a single case report investigation of the use of IR (general, restructuring schema/core beliefs) in conjunction with CBT, and Cooper et al. (2007) compared a single session imagery intervention (general, restructuring of core beliefs) to a control (verbal restructuring with no imagery).

The third potential target are specific images associated with poor body image. Pennesi and Wade (2018) showed that IR dealing with a specific, earliest memory of a personal unpleasant body experience involving shame or embarrassment of their body decreased disordered eating and increased body acceptance and self-compassion in young females at risk of developing an eating disorder.

The studies referenced above do not inform the efficacy of IR as a stand-alone approach to alleviating symptoms of eating disorders such as anorexia nervosa. The only attempt in using an imagery-based technique in treating an eating disorder can be found in a case report (Chung, 2015), where he utilized “motivational visualisation” with two patients with anorexia nervosa and showed successful treatment outcomes (e.g., increased motivation, and free of symptoms for 4-18 months with the use of this technique).

Current Research of IR for Eating Disorders

Tatham (2011) provided a detailed review of the role of imagery techniques in eating disorder treatment. She postulated that imagery techniques were relevant in addressing core beliefs, emotional dysfunction and body image that have proven difficult to treat using traditional CBT. Imagery may better target core beliefs, which tend to have a stronger emotional (as opposed to rational) component which may not respond to traditional CBT techniques such as cognitive restructuring. Use of imagery can more consistently elicit stronger emotions (Holmes & Mathews, 2010) and may enhance CBT. However, the efficacy of IR for disordered eating is not yet well understood with only three studies existing for people with eating disorders, and only one study examining at-risk populations in an early intervention context.

Ohanian (2002) presented a single case study investigating one session of IR after 8 sessions of CBT for Bulimia Nervosa (BN). The patient was asked to describe and rescript an early childhood memory associated with negative feelings about herself, and residual binge-

purge behaviours after eight sessions of conventional CBT reduced symptom behaviours by 50%, followed by one session of IR that led to an almost complete cessation of binge-purge behaviours, maintained at 14 weeks.

Cooper et al. (2007) compared a single session of IR to a control condition with 24 females with BN. While both groups showed reduction in rationally and emotionally held negative core beliefs, IR showed a greater reduction than the control group and increased a self-compassionate belief, "I deserve help and protection in that situation," more than the control intervention. Furthermore, a reduction in emotionally held beliefs was found to be associated with decreased depression and decreased urge to binge. However, it was not clear from the procedure what type of imagery participants chose to rescript (i.e., body/appearance specific or general negative event).

Pennesi and Wade (2018) compared single-session IR to a cognitive dissonance intervention and a control group among young body-dissatisfied females with an elevated risk of developing an ED. IR significantly increased body image acceptance compared to the cognitive dissonance group (Cohen's $d = 0.49$) and decreased disordered eating (Cohen's $d = 0.59$) and increased self-compassion (Cohen's $d = 0.59$) compared to the control group. Pennesi and Wade used a body IR approach where participants were instructed to rescript a past negative body experience where they felt ashamed or embarrassed about their body.

Most recently, Dugué et al. (2018) compared a single session of IR versus cognitive restructuring among 36 individuals with BED or BN. All participants were instructed to recall a social rejection situation. Core beliefs were elicited using the downward arrow technique and the strength of the belief was rated pre- and post-intervention, and at one-week follow-up. There were significant decreases in disordered eating, negative emotion and core belief ratings for both groups, with no between-group differences. Within-group (between any two

consecutive points in time) effect size decreases in emotional core beliefs ranged from 0.68 – 3.12 (Cohen's *ds*) for the IR group and 0.30 – 0.86 for the cognitive restructuring group.

Targets of IR outside of disordered eating

As outlined in the description of IR in the Oxford Guide to Imagery in Cognitive Therapy (Hackmann et al., 2011), one of the outcomes of IR is to evoke a sense of mastery or compassion for the self. Self-compassion can be particularly hard to practice due to feelings of unworthiness, fears of becoming weak and that standards will drop, described by Gilbert et al. (2011) as fear of self-compassion. Low self-compassion and fear of self-compassion have relevance in the maintenance of disordered eating (Duarte et al., 2017; Kelly & Carter, 2015; Kelly et al., 2016; Turk & Waller, 2019; Wilson et al., 2000) and research directly links self-compassion and eating disorder pathology.

First, lower self-compassion is associated with a higher level of disordered eating in both clinical and non-clinical samples (Braun et al., 2016; Kelly et al., 2014), with stronger associations in clinical samples (Ferreira et al., 2013). Fear of self-compassion was observed to be the strongest predictor of an eating disorder in clinical samples, whereas low self-compassion was the strongest predictor in non-clinical samples (Kelly et al., 2014).

Second, self-compassion training has been shown to reduce symptoms of eating disorders (Albertson et al., 2014; Gale et al., 2012; Neff & Germer, 2012). Finally, patients with eating disorders who gain the most improvement in self-compassion over treatment demonstrated a significantly greater decrease in eating disorder symptoms (Kelly et al., 2013a). Hence, as IR directly instructs participants to rescript the past in a self-compassionate way by meeting past unmet needs, we expect IR to increase self-compassion among participants.

Our outcomes of interest include dysfunctional attitudes, reflecting negative core beliefs such as clinical perfectionism and low self-esteem that were postulated as important

risks and/or maintenance factors across many different theories that inform interventions for disordered eating (Pennesi & Wade, 2016). In addition, Hinrichsen et al. (2007) found that prior to vomiting, patients with bulimia nervosa reported thoughts related to negative core beliefs such as defectiveness/shame, failure, and social isolation. We expected that by rescripting, participants would be able to change some meanings of the emotional imagery and hence weaken their previously held dysfunctional attitudes about themselves, other people and the world.

Psychoeducation

The active comparison intervention used throughout this thesis is psychoeducation – a key ingredient of eating disorder treatment. Specifically, we use psychoeducation related to the plasticity of the brain that can enhance recovery. Accumulating evidence highlights the importance of the epigenetic process in the development of eating disorders (Steiger & Booij, 2020), such that the environment (including nutrition) can impact and modify the expression of certain genes through DNA methylation to promote recovery. Psychoeducation that has taken a hopeful message of "malleable biology" has been shown to decrease shame and stigma surrounding eating disorders (Michael et al., 2020), and improve optimism and self-efficacy (Farrell et al., 2015) among patients with eating disorders. Research also suggests that that a single session assessment and psychoeducation session for people on a wait list for eating disorder treatment may improve retention and outcome once treatment is initiated (Fursland et al., 2018). The psychoeducation used was the handout "Eating Disorders & Neurobiology" available on the Centre of Clinical Intervention (CCI) website (https://www.cci.health.wa.gov.au/Resources/Looking-After-Yourself/Disordered-Eating).

Objectives of this thesis

This thesis seeks to fill an important gap in the eating disorder literature examining whether IR is indeed helpful as stand-alone intervention for those at risk of developing an

eating disorder, and as an adjunct treatment for eating disorders. We will do so by first examining whether there is any superiority effect of the two approaches to IR (**Chapter 4)**, namely rescripting disorder-specific negative body images (body specific IR) or rescripting past aversive experiences not specific to disordered eating but of relevance to negative core beliefs (general IR), in a population of young females at risk of developing an eating disorder. Second, building on the findings from the first study, we will examine the efficacy of IR when combined with psychoeducation (**Chapter 5)**. Third, we will then examine IR as an adjunct to treatment as usual in a randomized controlled trial with day patients diagnosed with eating disorders, primarily anorexia nervosa **(Chapter 6)**. And finally, we combine the samples in **Chapters 4 and 5** to examine for whom and under what conditions is IR most helpful (moderator analyses, **Chapter 7**).

CHAPTER 3: MEASURES

Overview

This chapter introduces the measures that were used across the studies that comprise this thesis. The following measures were used in Chapters 4, 5, 6, and 7 and additionally the Depression, Anxiety Stress Scale and the Clinical Impairment Assessment Questionnaire were used in Chapter 5. Copies of these measures can be found in ***Appendix G***. Each section below provides a description, and then information on reliability, validity, and factor structure.

Weight Concern Scale

Description

The Weight Concern Scale (WCS; Killen et al., 1994) is a 5-item scale that measures preoccupation with body weight and shape. Sample questions include “how afraid are you to gain 3 pounds (translated to 1.36 kg for the Australian context)”, “Compared to other things in your life, how important is your weight to you?”, and “Do you ever feel fat?”. Each item is measured differently depending on the content. For instance, items 1, 2, and 5 are measured on a 5-point Likert Scale (respectively 1=I worry a lot less than other women, 5= I worry a lot more than other women; 1= Not afraid, 5= Terrified; and 1= Never and 5 = Always). Item 3 is measured on a 7-point Likert scale (1 = I’ve never been on a diet, 4 = I was on a diet about 3 months ago, and 7= I’m now on a diet). Item 4 was measured on a 4-point Likert scale (1= My weight is not important compared to other things in my life, 4 = My weight is the most important thing in my life). An item score is derived by the following formula: 100* (Q response – 1)/(N of response options -1), and then the total score is calculated by summing and averaging the five item scores. Possible scores that can be obtained from this questionnaire range from 0 to 100.

Reliability

We do not report Cronbach alpha for our studies as we solely used the WCS as a cut-off score. Other research has reported an internal consistency of 0.77-0.85 for WCS among young university students (Forbush et al., 2013; da Silva et al., 2017). Test-retest reliability (7- month) was reported to be .71 among sixth and seventh-grade girls (Killen et al., 1994, p. 231), and .75 among ninth-grade girls (12-month interval; Killen et al., 1996, p. 937).

Validity

Killen et al. (1994) found that WCS is correlated with the overall Eating Disorder Inventory (Garner et al., 1983) score (r = .43 to .72) and body dissatisfaction (r = .83 – .99; also in da Silva et al, 2017). Convergent validity of the online format of the WCS was found to be adequate (Dias et al., 2015b). The WCS evidenced good predictive validity with its scores significantly correlated with the onset of eating disorder symptoms among young adolescents over three years (Killen et al., 1994; Killen et al., 1996). Jacobi et al. (2004b, p. 290) used a Receiver Operating Characteristic (ROC) Curve analysis and found that a score of >=47 is considered high-risk for developing an eating disorder.

Factor structure

One-factor model presented an adequate fit to a sample of Brazilian University students (Dias et al., 2015a). Researchers also found that the factor structure is not significantly different when WCS is administered online than paper-and-pencil format (Dias et al., 2015b). No other research on the factor structure of WCS was identified.

Eating Disorders Examination – Questionnaire

Description

The Eating Disorder Examination Questionnaire (EDE-Q; Fairburn & Beglin, 1994) is a 28-item self-report measure of both cognitive features and behavioural symptoms of eating disorders in the past 28 days. Out of the 28 items, 22 are used to derive a global disordered eating pathology score which consist of four subscales: dietary restraint, eating

concern, shape concern and weight concern. Sample items include, “On how many of the past 28 days …have you tried to exclude from your diet any foods that you like in order to influence your shape or weight (whether or not you have succeeded)/ has thinking about shape or weight made it very difficult to concentrate on things you are interested in/ have you felt fat?” Questions which assess the frequency of concerns were rated on a 7-point Likert scale where 0 = No days, 1 = 1-5 days, 2 = 6-12 days, 3 = 13-15 days, 4 = 16-22 days, 5 = 23- 27 days, and 6 = everyday. Questions that assess the intensity of concerns such as “how dissatisfied have you been with your shape”, were rated on a 7-point Likert scale where 0 = Not at all, 6 = Markedly. Higher scores indicate higher global disordered eating psychopathology.

An additional six items were used to assess the frequencies of disordered eating behaviours including objective binge-eating (item 13, 14 and 15), self-induced vomiting (item 16), laxative misuse (item 17) and driven exercise (item 18). Higher scores indicate higher incidence of disordered eating behaviours in the past 4 weeks. Sample items are “over the past 28 days, how many times have you taken laxatives as a means of controlling your shape or weight”. We also use an item that was used in the calculation of the global EDE-Q score (i.e., item 2) to indicate the behavioural frequency of fasting specifically (i.e., on how many of the past 28 days have you gone for long periods of time, 8 waking hours or more, without eating anything at all in order to influence your shape or weight).

Reliability

A literature review by Berg et al. (2011) suggested that the test-retest (2 – 7 days and 6 – 14 days) reliability of the four subscales of EDE-Q are .76 to .88 for Restraint, .51 to .87 for Eating Concern, .50 to .94 for Shape Concern, and .52 to .92 for Weight Concern. These test-retest reliabilities were 0.51 to 0.92 for the behavioural episode items (i.e., objective/subjective bulimic/vomiting episodes). The Subjective Bulimic Days had the lowest

test re-test reliability (Spearman's rho of .39). The global EDE-Q score's test-retest (7-day) reliability reported by Rose et al. (2013) was 0.89 for men and 0.90 for women. Further, test-retest reliability was lower for eating disorder behaviours, especially in men (e.g., Spearman's rho is 0.41 for Objective Binge Eating days among men).

Luce and Crowther (1999) reported the internal consistency for the four subscales were .84 - .85, .92 - .93, .89, and .78 - .81 respectively. Berg et al.'s review (2011) suggest EDE-Q's internal consistency lies between 0.70 to 0.93. The internal consistency for the global EDE-Q score reported by Rose et al. (2013) ranges from 0.91 to .92 for women and .83 to .87 for men. Luce and Crowther (1999) reported the reliability of the EDE-Q items which measures behavioural occurrence and frequency of disordered eating which were all found to be significant (ranging from .57 to .70 for occurrence Phi Coefficient, and .54 to .92 for frequency Pearson *r* coefficients).

Validity

Although some data suggest the EDE-Q is able to differentiate eating disorder cases from non-cases, a review (Berg et al., 2011) suggested only one study adequately utilized a structured interview to diagnose eating disorders (Mond et al., 2004) with other comparative studies exhibiting limitations such as a small number of cases with an eating disorder. Specifically, Mond et al. (2004) suggested that a mean global EDE-Q score of 2.3 in conjunction with the occurrence of any OBEs and/or use of exercise as a means of weight control, predicts ED cases from non-cases. Rø et al. (2015) similarly found that the global EDE-Q score has high discriminant validity to differentiate an ED case from a non-ED case with a cut-off score of 2.50. In the research presented here, we used the cut-off 2.77 (Mond et al., 2006), which is one standard deviation (1.25) above the mean (1.52) of females without an eating disorder, as indicating the clinical cut-off for young females.

Factor structure

The original structure of EDE-Q has four scales – Restraint (consists of item 1, 2, 3, 4, 5), Shape Concern (6, 8, 10, 11, 23, 26, 27, 28), Weight Concern (item 8, 12, 22, 24, 25) and, Eating Concern (item 7, 9, 19, 20, 21). According to a recent literature review (Rand-Giovannetti et al., 2020), except for a couple studies supported the original four-factor model (e.g., Franko et al., 2012; Villarroel, et al., 2011), most replications do not support the original four-factor model (see Table 1 in Rand-Giovannetti et al., 2020, p.166). This most recent comparison of different structural models as well as reduced-item models of EDE-Q revealed that Friborg et al.'s (2013) four-factor model (dietary restraint, pre-occupation and restriction, weight and shape concern, and eating shame), received the most support among all the models which included all the original subscales items, with a comparative fit index (CFI) = .951, root mean square error of approximation (RMSEA) = .077 and Tucker-Lewis index (TLI) = 0.944).

In terms of reduced-item models, more models fit well which included Darcy et al.'s (2013) three-factor model (CFI = 0.954 in female non-athlete, CFI = 0.955 in male athlete) and Grilo et al., (2012) three-factor model (CFI = 0.987), Hrabosky et al.'s (2008) three-factor model (CFI = 0.989). Parker et al.'s (2015, 2016) four-factor models have indices closest to the Hu and Bentler's (1999) cut off values (RMSEA = 0.057, TLI = 0.977, CFI = 0.982). The review (Rand-Giovannetti et al., 2020) also found that the higher-order model may be a worse fit than first-order model which may render using a global score problematic. But they also discussed that such results stemmed from a chi-square difference test which can be very sensitive to small differences in fit between models.

Body Image Acceptance & Action Questionnaire

Description

The Body Image Acceptance & Action Questionnaire (BI-AAQ; Sandoz et al., 2013) is a 12-item self-report questionnaire that measures body image flexibility, which reflects the

ability to place body-related thoughts and feelings in a larger context rather than allowing life to be directed by those feelings. It was defined by the researchers who developed this scale as "actively contacting perceptions, thoughts, beliefs and feelings about the body without attempts to change their intensity, frequency, or form" (Sandoz et al., 2013, p. 41). Sample items include "Worrying about my weight makes it difficult for me to live a life that I value", "I care too much about my weight and body shape". Participants rate how true these statements are on a 7-point Likert Scale (1= never true; 7 = always true). In this thesis, the total score of BI-AAQ was calculated by reverse-scoring and taking the mean of all item scores. Higher scores indicate higher body image flexibility.

Reliability

The original psychometric studies revealed that the internal consistency of this measure ranged from 0.92 to 0.93 and test-retest reliability was 0.80 (Sandoz et al., 2013). In a US sample, the internal consistency was .91 - .92 (Timko et al., 2014). In a Portuguese sample, the internal consistency was .95, and the test re-test reliability was .82 (Ferreira et al., 2011).

Validity

Men tend to have higher body image flexibility than women (Ferreira et al., 2011; Linardon et al., 2020; Sandoz et al., 2013). Ferreira et al. also found that body mass index (BMI) is negatively correlated with body image flexibility (although in Sandoz et al., 2013 this correlation only approached significance) and hence, BMI is commonly included as a covariate in analyses involving the BIAAQ. In terms of concurrent validity, the BI-AAQ was found to be correlated with lower body dissatisfaction (measured by the Body Shape Questionnaire; Cooper et al., 1987), disordered eating (measured by the Eating Attitudes Test - 26; Garner et al., 1982), and higher overall psychological flexibility (measured by the Acceptance and Action Questionnaire – II; Bond et al., 2011). Ferreira et al. found that BI-

AAQ was positively correlated with self-compassion, negatively correlated with body dissatisfaction, psychological distress, and eating disorders symptomology. Timko et al. (2014) found that body image flexibility is highly negatively correlated with body image avoidance. The BI-AAQ also partially explains the relationship between body image dissatisfaction and disordered eating (Timko et al., 2014). In terms of predictive validity, body image flexibility predicted disordered eating behaviours above and beyond body shape dissatisfaction (Sandoz et al., 2013).

Factor structure

The BI-AAQ was first considered to be unidimensional, accounting for 54% of the variance (Sandoz et al., 2013, p. 45) with all twelve items having a factor loading above .60 (p.42). Ferreira et al. (2011) and Pellizzer et al. (2018) also supported the unidimensional model. Specifically, Pellizzer et al. (2018) suggested that all twelve items had a factor loading equal to or above .80 (except item 6, which has a factor loading of .43). However, Linardon et al. (2020) did not replicate the unidimensional model for either men (RMSEA = 0.085, CFI = 0.942 and TLI = 0.929) or women (RMSEA = 0.089, CFI = 0.944 and TLI = 0.931). On the other hand, Linardon et al., (2020) suggested that the abbreviated BI-AAQ (5-item; Basarkod et al., 2018) demonstrated a unidimensional structure.

Dysfunctional Attitude Scale - Short Form 1

Description

The Dysfunctional Attitude Scale – Short Form 1 (DAS-SF1; Beevers et al., 2007) is a 9-item scale which measures negative or rigid dysfunctional beliefs such as perfectionism, need for approval or low self-esteem. Sample items include “If I don’t set the highest standards for myself, I am likely to end up a second-rate person” “My value as a person depends greatly on what others think of me”, “I am nothing if a person I love doesn’t love me”. Participate rate how accurate these items reflect their attitudes on a 4-point Likert scale

(1= totally agree; 4 = totally disagree). The total score is derived by reverse scoring and taking the mean of all items, which ranged from 1 - 4. Higher scores indicate greater dysfunctional attitudes.

Reliability

DAS-SF1, one of the two short forms of the 40-item Dysfunctional Attitude Scale, form A (Weissman, 1979), has found to be highly correlated (.91) with the original DAS-A scale (Beevers et al., 2007). The internal consistency was reported to be .79- .93 (Ara, 2016; Beever et al., 2007; Bianchi & Schonfeld, 2016; Keng et al., 2016; McDermut et al., 2019). The two short forms (DAS-SF1 and DAS-SF2) are found to be highly correlated with each other (Beevers et al., 2007).

Validity

In terms of convergent validity, both short forms were moderately correlated with hopelessness (.25 to .30), cognitive bias (.53-.57; Beevers et al., 2007), self-debasing cognitive distortion (.21, Ara, 2016), unhelpful thinking (.56; Ara, 2016; Knowles et al., 2017), burnout (.46 in men, and .42 in women; Bianchi & Schonfeld, 2016), depression (.45-.47 in women and men, Bianchi & Schonfeld, 2016), negative emotionality, psychoticism and introversion (McDermut et al., 2019). In terms of predictive validity, greater levels of dysfunctional attitudes at baseline predicted less change in depressive symptoms when adjusting for baseline depression at post-treatment (Beevers et al., 2007).

Factor structure

The original factor structure for the DAS-A contains two factors – perfectionism and need for approval (Imber et al., 1990), which was later found to be sufficiently accounted for by a single latent factor (Zuroff et al., 1999). The DAS-SF1 retains the single factor structure (McDermut et al., 2019) and use a total score to indicate dysfunctional attitudes.

Clinical Perfectionism Questionnaire

Description

The Clinical Perfectionism Questionnaire (CPQ; Fairburn et al., 2003b) is a 12-item scale that measures clinical perfectionism, that is, striving to meet demanding standards despite negative consequences, and basing self-worth on achievement. Sample item include "over the past month, have you tended to focus on what you have achieved, rather than what you have not achieved; … have you raised your standards because you thought they were too easy;… have you repeatedly check how well you are doing at meeting your standards (for example by comparing your performance with that of others". Participants rate how true each item describes them on a 4-point Likert scale (1= Not at all; 4 = All of the time). The total score was traditionally computed by reverse scoring item 2 and 8 and taking the mean of all items. However, research suggested that neither the reverse-coded items made a significant contribution to the CPQ total score based on their low item-total correlations and that internal consistency of the CPQ improved when these two items are removed (Dickie et al., 2012; Prior et al., 2018; Stoeber & Damian, 2014). Therefore, we calculated total CPQ score in this thesis by taking the mean of all items except item 2 and 8. The possible mean item range is 1-4, where higher scores indicate higher perfectionism.

Reliability

CPQ was reported to have good internal consistency of .71-.0.73 (in a non-clinical sample; Dickie et al., 2012; Egan et al., 2016), 0.82 – 0.83 (in an eating disorder clinical sample, Egan et al., 2015; Steele et al., 2010), and .74-.77 (in a sample with elevated perfectionism). Four-month test-retest reliability was .49 to.67 (Dickie et al., 2012).

Validity. The CPQ was highly correlated with negative affect (measured by PANAS-NA; Watson et al., 1988) and all facets of perfectionism such as concerns over mistakes, personal standards as measured by the Frost Multidimensional Perfectionism Scale (Frost et al., 1990), hence suggesting good convergent validity (Dickie et al., 2012; Egan et al., 2015).

Howell et al. also found that the general perfectionism factor of CPQ is a predictor of psychological distress (depression, anxiety, and stress) and the subfactor of perfectionism striving was associated with only depression (2020). CPQ demonstrates good discriminate validity such that eating disorder patients score significantly higher on CPQ on both factor 1 and 2 compared to community sample, and such difference remains after controlling for age (Egan et al., 2015).

Factor structure

A two-factor structure was first suggested in Egan et al. (2015). Item loadings were .71-.80 and .63 – .64 for factors 1 and 2 respectively in community and clinical sample (p. 83 and 87) where factor 1 predominately captures over-evaluation of striving (e.g., judge self on the basis of ability to achieve high standards) and factor 2 assesses concern over mistakes (e.g., avoid any tests of performance at meeting your goals in case you failed). Prior et al. (2018) removed item 2 and 8 (the reverse-scored items) and found a bi-factor model that fits well to the data (CFI = .954, TLI -= .940, RMSEA = .072) with a general factor a clinical perfectionism and group factor 1 (overvaluation of striving). Howell et al. (2020) suggested that both one-factor and two-factor models were poor fit and found support for the bi-factor analysis (with weaker group factor 1).

Self-Compassion Scale – Short Form

Description

The Self-Compassion Scale – Short Form (SCS-SF; Raes et al., 2010) is a 12-item self report measure that the extent to which an individual act in a self-compassionate manner in difficult times. It originated from the Self Compassion Scale developed by Neff (2003). Sample items include “when I fail at something important to me I become consumed by feelings of inadequacy” “I try to be understanding and patient towards those aspects of my personality I don’t like” and “when something painful happens I try to take a balanced view

of the situation". Participants respond how accurate these statements describe themselves on a 5-point Likert Scale (1= almost never; 5= almost always). The total SCS-SF score was calculated by taking the means of all items after reverse-scoring items 1, 4, 8, 9, 11, and 12.

Reliability

The short form is highly correlated with the original scale (r =.98). The SCS-SF has an overall internal consistency of 0.84 - 0.89 (Babenko & Guo, 2019; Castilho et al., 2015; Raes, 2011; Raes et al., 2010). In a student sample, the internal consistency was excellent 0.92 (Kelly et al., 2014). The internal consistency of each subscale ranges from 0.54 to 0.75 (Raes et al., 2010). The five-month test-retest reliability was reported to be 0.71 (Raes, 2011).

Validity

The SCS-SF total score was found to be negatively associated with depression, social anxiety, generalized anxiety, hostility, academic distress, eating concerns, family concerns and substance use (Hayes et al., 2016). On the other hand, SCS-SF total score was positively correlated with perceived support from family and friends (Hayes et al., 2016). Among medical students, SCS-SF was found to be correlated with engagement in studies and negative correlated with feelings of exhaustion (Babenko & Guo, 2019). In terms of predictive validity, Raes (2011) found that SCS-SF predicted change in somatic and affective, but less so cognitive, depressive symptomatology.

Factor structure

There are six subscales in the short form as there is in the original form: self-kindness, self-judgement, common humanity, isolation, mindfulness, and over-identification. Each subscale contains two items. Items from the self-judgement (item 11 and 12), isolation (item 4 and 8) and over-identification (item 1 and 9) subscales were reversed scored. Hayes et al. (2016) and Bratt and Fagerström (2019) did not find support for this six-factor model. Raes et al. suggested a higher-order factor structure (i.e., one general self-compassion factor) for the

short-form (2011), which is also supported by Babenko and Guo (2019). Hayes et al., (2016) found that the single factor did not provide an adequate fit and found support for a two-factor model consist of self disparagement and self care. Babenko and Guo (2019) also suggested that while the single factor was an acceptable fit, the two-factor model fits better (i.e., consist of the positive "self-compassion" and negative "self-criticism" components of SCS-SF). Among a sample of older adults (aged 66 to 102 years), Bratt and Fagerström found support for the positive and negative two-factor model of SCS-SF, despite only finding good internal consistency for the negative component.

Fear of Self-Compassion Scale

Description

The Fear of Self-Compassion Scale (FCSelf; Gilbert et al., 2011) is a 15-item subscale from the Fear of Compassion Scale. It measures the extent to which one experiences barriers towards expressing kindness and compassion towards the self. Sample items include "I feel that I don't deserve to be kind and forgiving to myself", "If I really think about being kind and gentle with myself it makes me sad", and "Getting on in life is about being tough rather than compassionate". Participants rate how much they agree to each statement on a 5-point Likert scale (1= don't agree at all, 5 = completely agree). A summary score was calculated for FSC by taking the mean of all items. Higher scores indicate higher fear of self-compassion.

Reliability. Gilbert et al. (2011) reported internal consistency to be 0.85 (therapist sample) to 0.92 (student sample), similar to that reported by Geller et al. (2019), 0.83 -0.92. Studies that utilized the FCSelf among people with an eating disorders reported an internal consistency of .95 (Kelly et al., 2013b; Kelly et al., 2014), similar to what was found among college women in Boykin et al. (2018) and Miron et al. (2016).

Validity. FCSelf was found to be negatively associated with self-compassion among both student and therapist and positively correlated with depression, anxiety and stress among students and only depression among therapists (Gilbert et al., 2011). FCSelf was also found to be positively correlated with aspects of self-criticism, such as feeling of inadequacy and self-hatred (Gilbert et al., 2011). Miron et al. (2016) suggested that among those who have higher psychological inflexibility, fear of self-compassion predicted posttraumatic stress symptoms. In its relevance with eating disorder, research suggest higher fear of self-compassion at baseline predicts poor treatment outcomes hence an important treatment target (Kelly et al. 2013b).

Factor structure

Gilbert et al. (2011) originally suggested FCself contain a single factor. Geller et al. (2019) later suggested that FCself contains two factors – meeting standards and emotional vulnerability. The first factor, meeting standards refers to concerns about showing flaws and losing achievements and relationships when self-compassion is practiced. The second factor, emotional vulnerability, refers to feeling difficult emotions such as unworthiness and grief when self-compassion is practiced. However, there is a reasonable amount of shared variance between the two factors, Geller et al. hence recommended that using a summary score.

Depression, Anxiety and Stress Scale - 21

Description

The Depression, Anxiety Stress Scale-21 (DASS-21) is a short form of the original DASS-42 (42-item version; Lovibond & Lovibond, 1995), that measures symptoms and distress associated with depression, anxiety and stress. Participants rate the extent to which a statement applies to them in the past week on a 4-point Likert Scale (0 = never, 3 = almost always). There are three subscales: depression, anxiety and stress. Sample items include, “I felt that life was meaningless” (depression), “I was worried about situations in which I might

panic and make a fool of myself" (anxiety) and "I found it hard to wind down" (stress). Scores of each subscale were calculated by summing all the items that belong to a subscale. Higher scores on each subscale indicate higher severity of symptoms or disturbance of depression/anxiety or stress.

Reliability

Antony et al. (1998) were one of the first to report psychometric properties of the short form DASS-21. They reported the internal consistency for the three scales in DASS-21 were .94 for Depression, .87 for Anxiety and .91 for Stress. Clara et al. (2001) reported similarly good internal consistency were .92 for Depression, .81 for Anxiety, and .88 for Stress. Henry and Crawford (2005) also reported satisfactory internal consistency of the three subscales. The test-retest reliability of DASS-21 obtained from a Turkish healthy control sample was .68 for depression, .66 for anxiety and .61 for stress (Sariçam, 2018).

Validity

In multiple studies, the DASS-21 was found to correlate with similar measures such as the Beck Anxiety Inventory (BAI, Beck & Steer, 1990; Antony et al., 1998; Gloster et al., 2008), Beck Depression Inventory (BDI, Beck et al., 1996; Antony et al., 1998; Gloster et al., 2008; Osman et al., 2012), PANAS-NA (Henry & Crawford, 2005; Watson et al., 1988), and Penn State Worry Questionnaire (PSWQ, Meyer et al., 1990; Gloster et al., 2008). DASS-21 was also found to be negatively correlated quality of life and positive affect (Gloster et al., 2008). DASS 21 demonstrated good discriminate validity as low correlations were observed between measures of unlike such as the depression subscale and the BAI (Antony et al., 1998; Henry & Crawford, 2005; Gloster et al., 2008). Additionally, a non-clinical sample scored significantly lower on depression, anxiety and stress subscales than diagnostic groups (depression and/or anxiety) among older adults (Gloster et al., 2008).

Factor structure

Confirmatory factor analysis suggest that DASS-21 follows the same three-factor model as does DASS-42 (Antony et al., 1998; Clara et al., 2001). In fact, Clara et al., (2001) suggested that the 21-item version provided an improved fit than the 42-item version, and their inter-factor correlations revealed a clearer distinction between anxiety, depression symptoms compared to the 42-item. In addition to finding evidence supporting the three-factor model, Henry and Crawford (2005) also found when provided an additional general factor, an overall distress factor, which account for the majority of variance in the DASS-21 score, it produced an even better fit. Osman et al. (2012) supported the bifactor model with a general factor that accounted for the greatest proportion of variance in DASS-21.

The Clinical Impairment Assessment Questionnaire

Description

The Clinical Impairment Assessment Questionnaire (CIA; Bohn et al., 2008) is a 16-item self-report measure of psychological impairment due to an eating disorder. Participants rate the extent to which various functioning (e.g., concentration, work performance, family and friends) have been impacted by their eating habits, exercising, or feelings about eating, shape or weight affected their life over the past 28 days. Sample items include “difficult to concentrate”, “feel critical of yourself”, and “stopped you going out with others”. Responses were rated on a 4-point Likert scale (0=Not at all, and 3= A lot). A global summary score was calculated by taking the mean of all item scores. Possible scores range from 0 to 3 with higher rating indicating higher levels of impairment.

Reliability

The internal consistency is excellent for the global score, ranging from 0.91 to 0.97 (Bohn et al., 2008; Jenkins, 2013; Reas et al., 2009; Vannucci et al., 2012). The test-retest

reliability was .86 for three days (Bohn et al., 2008), and 0.94 for one week (Reas et al., 2009), indicating a good test-rest reliability.

Validity

In both a non-clinical and clinical sample, the CIA was found to be positively correlated with eating disorder psychopathology (Jenkins, 2013; Maraldo et al., 2021; Reas et al., 2009; Vannucci et al., 2012). In the clinical sample, the CIA is also associated with depression and anxiety (Jenkins, 2013), and health-related quality of life (Maraldo et al., 2021). Similarly, in an at-risk sample, the CIA was associated with disordered eating attitudes and disordered eating behaviours (Vannucci et al., 2012). In terms of discriminant validity, several studies found that CIA can differentiate those who have an eating disorder from those without (Jenkins, 2013; Vannucci et al., 2012), with a clinical cut-off of 16 for a summed score. In terms of predictive validity, change in the CIA positively was associated with change in eating disorder psychopathology and health-related quality of life, with lower admission CIA correlated with recovery status at discharge (Maraldo et al., 2021)

Factor structure

Three factors, personal, social and cognitive impairment, were generated from principal components factor analysis (Bohn et al., 2008), supported in Reas et al. (2009). Bohn et al. (2008) also suggested it is appropriate to use both global and domain-specific scores. Raykos et al. (2017) supported that the global score is reliable as it reflects a general impairment factor underlying items on the CIA. Raes et al. (2010) found that items from the personal domain contributed the most to the CIA global score. Recent research found that a bifactor model (i.e., a general factor with three correlated subfactors) fit best for this instrument (Maraldo et al., 2021). These researchers found that the three subscales were not reliable hence recommended using the global score.

Positive and Negative Affect Schedule – Negative Affect (state measure)

Description

The **Positive and Negative Affect Schedule – Negative Affect** (PANAS- NA; Watson et al., 1988) is a 10-item subscale from the PANAS. Items contain one word describing a negative emotion such as “distressed” “upset” “guilty”. Participants rate the extent to which they feel an emotion at the present moment on a 5-point Likert scale (1 = very slightly or not at all; 5 = extremely). A mean score of all items was used. Higher scores indicate higher negative affect.

Reliability

The internal consistency was around 0.85 for NA (Crawford & Henry, 2004; Thompson, 2007; Watson et al., 1988) and in some instances as high as 0.90 (Osman et al., 2002; Serafini et al., 2016). Test-re-test reliability was 0.76 in Serafini et al. (one-week; 2016), and 0.67 (8-12 weeks; Serafini et al., 2016) and .45 (2-month; Watson et al., 1988).

Validity

The NA subscale (Watson et al., 1988) was strongly correlated with general distress (measured by the Hopkins Symptoms Checklist, Derogatis et al., 1974; *r*= .65-.74), and moderately with depression (measured by the Beck Depression Inventory, Beck et al., 1996; *r*= .56-.58) and current affect in response to stressful events (measured by A-state, Spielberger et al., 1970). Crawford and Henry (2004) found similar findings that NA is positively associated with depression, anxiety and stress (r = 0.60, 0.60, 0.67 respectively). Further, Serafini et al. (2016) found that NA is positively correlated with all subscales in the Brief Symptom Inventory (Derogatis, 1993) such as obsessive compulsive, interpersonal sensitivity, anxiety and depression as well as addictive severity. Serafini et al. also found that NA is negatively associated with treatment outcomes measured by consecutive abstinence (i.e., maximum days of consecutive abstinence form primary substance of abuse during

treatment) and treatment completion. Osman et al. (2002) found that NA is also positively correlated with suicidal ideation.

Factor structure

The overall PANAS scale contains two factors (positive affect [PA] and negative affect [NA]), with strong factor loadings (Watson et al., 1988, p. 1067). However, Crawford and Henry (2004) found that the model assuming two independent factors (PA and NA) was also a poor fit. They found that if such model treats PA and NA as correlated factors (not independent factors) and permits correlated errors, it is a superior fit. Therefore, they suggest that NA and PA are "at least" moderately interdependent. This finding was further supported by Serafini et al. (2016) who found that among outpatient substance users, the PANAS fit a two-factor correlated model with correlated item errors.

Body Image States Scale (state measure)

Description

The Body Image State Scale (BISS; Cash et al., 2002) is a six-item measure of individuals' evaluation and affect about their physical appearance at a particular moment in time. Sample items include "right now I feel … 1 = extremely dissatisfied with my physical appearance; 9 = extremely satisfied with my physical appearance", "right now I feel… 1= a great deal worse about my looks than I usually feel, 9 = A great deal better about my looks that I usually feel", and "right now I feel…1= a great deal better than the average person looks and a great deal worse than the average person looks". Items 2, 4, 6 were reversed scored, and a summary score was calculated by taking the mean of all items after reverse-scoring. Possible scores range from 1 to 9. Higher scores indicate more positive state body image or higher state body image satisfaction.

Reliability

The internal consistency of this scale reported to be between 0.62 to 0.92 (Cash et al., 2002; Etu & Gray, 2010; Kinkel-Ram et al., 2021; Rudiger et al., 2007; Schaumberg & Anderson, 2014). Test-retest reliability was between 0.68 to 0.69 over 2 weeks which was considered acceptable for a state measure (Cash et al., 2002).

Validity

Lower BISS significantly predicted trait body image dissatisfaction and preoccupation about weight (Cash et al., 2002). The BISS was found to be significantly negatively correlated trait body image dissatisfaction, body-image cognitive distortion, and body mass index (Rudiger et al., 2007). Melnyk et al. (2004) also found that the BISS is positively correlated with body areas satisfaction, and positive body image coping strategies but negatively correlated with trait body image dissatisfaction, dysphoria, dysfunctional investment in one's appearance and less adaptive coping strategies. In terms of eating disorders behaviours, the BISS was found to be associated with disordered eating and intention to engage in disordered eating (Kinkel-Ram et al., 2021; Rudiger et al., 2007)

Factor structure

The BISS has generally been used as a single factor construct, but little research has analysed the factor structure of this scale. Exploratory and confirmatory factor analyses of the Spanish version of the BISS supported the one-factor model as best describing its factorial structure (Mebarak Chams et al., 2019).

Conclusion

Measures used in this thesis have sound psychometric properties, including good internal consistency, test-retest reliability, convergent validity, discriminate validity and valid structures.

CHAPTER 4: BODY IR VERSUS GENERAL IR (STUDY 1)

Abstract

Objective: This study compared the effectiveness of two approaches to imagery rescripting (body versus general) among young females with an elevated risk of developing an eating disorder. **Method**: University students (N = 130 females) were randomly assigned to one of the four conditions: body or general imagery rescripting, psychoeducation, control. After initial brief laboratory training delivered online, participants in the imagery rescripting conditions were asked to practise imagery rescripting for five minutes each day for a week. Primary (global eating psychopathology, eating disorder behaviors, and body image acceptance) and secondary outcomes (self-compassion, fear of self-compassion, and dysfunctional attitudes) were measured at baseline and one-week follow up. **Results**: Completer analyses showed both imagery rescripting conditions and psychoeducation had significant impact on global eating psychopathology and body acceptance (d = 0.60 – 0.78). Psychoeducation did not impact secondary variables, whereas body imagery rescripting improved self-compassion and fear of self-compassion (d = 0.61- 0.80) and general imagery rescripting improved dysfunctional attitudes (d = 0.82) compared to control. Intent to treat analyses had similar but slightly less robust results. **Discussion**: While three active groups had significant impact on the primary variables, imagery rescripting approaches had impact on other variables that maintain disordered eating. Future research should investigate the impact of combining psychoeducation and imagery rescripting in terms of impact on disordered eating.

Keywords: Imagery rescripting, Psychoeducation, Disordered eating, Eating disorder, Body dissatisfaction, Self-compassion

Introduction

Two types of Imagery Rescripting (IR) were identified in the broader literature (Brockman & Calvert, 2017). One targets disorder-specific imagery such as that in Post Traumatic Stress Disorder. The specific scene of an abuse, for instance, is relived and rescripted to achieve emotional processing in order to reduce symptoms such as intrusions. The second targets general negative imagery that are associated with maladaptive beliefs that are thought maintain the disorder, such as that used in personality disorder treatment. To date, however, no empirical studies have specifically compared the two approaches, or whether one is more beneficial for any specific clinical group.

This study aims to investigate and compare specific and general IR in a sample of young females at risk of disordered eating. Specifically, we compared the effects on decreasing disordered eating and enhancing self-compassion. We termed the disorder-specific IR approach Body IR (BIR), which rescripts a negative body experience such as being teased about weight and shape by peers. The general approach is termed General IR (GIR), which rescripts a general negative experience that resulted in people feeling bad about themselves as a person such as a social rejection, a relationship breakdown, or emotional neglect, that has no direct involvement of appearance, weight or shape. We hypothesized that: (1) BIR will impact disordered eating specific variables such as global eating psychopathology and body image flexibility since it directly targets body image, and (2) GIR may perform less well in areas specific to disordered eating but may have an impact on other psychological constructs that maintain disordered eating such as perfectionism, dysfunctional attitudes and low self-compassion.

We compared these two single-session IR approaches to a psychoeducation and a control group. The psychoeducation group received a handout “Eating Disorders & Neurobiology” from the Centre of Clinical Intervention (CCI) website. This intervention was

suggested by findings that a single session assessment and psychoeducation session for people on a wait list for eating disorder treatment may improve retention and outcome once treatment is initiated (Fursland et al., 2018). We expected that both IR approaches, due to their stronger impact on emotions than verbal information (Holmes & Mathews, 2010), would outperform both psychoeducation and control conditions.

Method

Participants

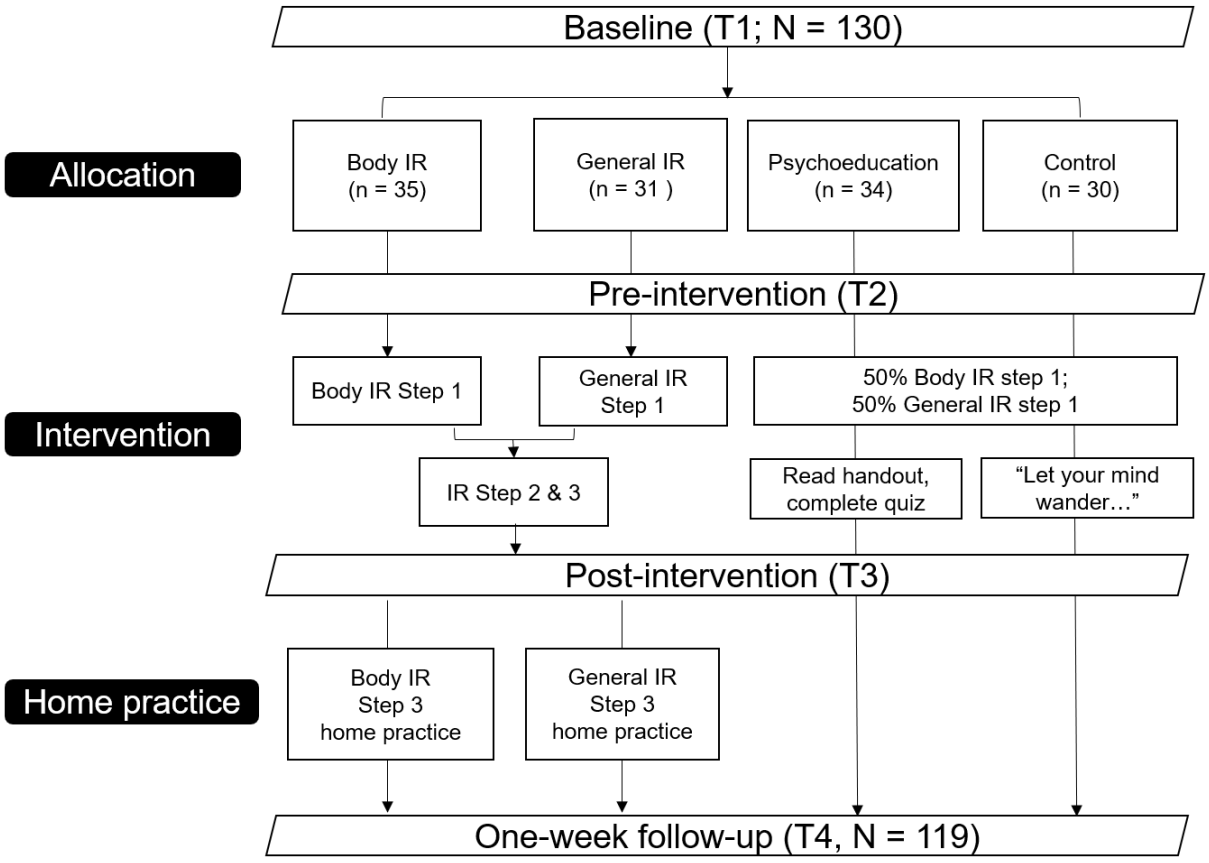
Females aged 17 years or older were recruited from the Flinders University School of Psychology research participation pool. Participants could opt to participate in this research for either course credits or cash reimbursement. Those who were at risk of developing an eating disorder were included in the study. Risk was indicated by a score on the Weight Concerns Scale (Killen et al., 1994, p. 232) of ≥ 47, which is considered a cut-off with good predictive validity for risk of developing an eating disorder (Jacobi et al., 2004b; Killen et al., 1994; Killen et al., 1996). The analytic sample for this study included 130 females ranging in age from 17 to 26 (*Mean* = 20.79, *SD* = 2.18) with a mean body mass index (BMI) in the healthy range (i.e., 18.5 – 24.99; World Health Organization, 2006); (*M* = 24.35, *SD* = 4.94). Most participants self-reported as Caucasian (63.8%) with the next largest groups being Asian (29.5%), Indian (4.6%), and Aboriginal/Torres Strait Islander (1.5%).

Design

This study was approved by Social and Behavioural Research Ethics Committee (SBREC) at Flinders University (#8041). This study was presented to participants as an investigation of new methods to improve body image among young females. There were four conditions: (1) body imagery rescripting (BIR), (2) general imagery rescripting (GIR), (3) psychoeducation, and (4) control. Eligible participants were invited to a research laboratory for a 60-minute session, where they completed baseline questionnaires and received their

randomly assigned conditions. All questionnaires were administered online using Qualtrics Survey and random assignment occurred by the 'Randomizer' element in the Qualtrics Survey Flow. Participants' informed consent was obtained in person upon arrival in the laboratory. Participants completed trait measures at baseline (T1) and one-week follow up (T4), and state measures at T1, post-induction/pre-intervention (T2) and post-intervention (T3), see ***Figure 1***.

Figure 1. Study design.



GIR was adapted from the protocol developed for Social Anxiety Disorder by Arntz and Weertman (1999); the BIR was taken from the procedure used by Pennesi and Wade (2018). The two IR conditions consisted of three similar steps: (1) reliving (i.e., imagine the problematic memory); (2) observing (i.e., relive memory from an observer perspective), and (3) rescripting (i.e., rescript memory in a compassionate manner). The BIR differed from the GIR in only the first step – one prompted the participant to recall a body-specific negative memory whereas the other prompted a generic negative memory. The rest of the procedure was identical in both conditions. Psychoeducation and control participants were randomly assigned to undergo either BIR or GIR at step 1 to induce a similar level of negative body image and/or mood as the participants in the first step of the IR conditions.

Interventions

Written instructions were provided on the computer screen as described below and were also used for home practice. For full instructions, see **Appendix D** *Imagery rescripting instructions to Participants*.

Body IR and General IR.

Reliving (five minutes). Participants in the BIR conditions were asked to close their eyes and visualize a recent unpleasant body experience where they might have felt ashamed or embarrassed of their bodies or appearance e.g., peer teasing or negative comments with respect to appearance or feeling uncomfortable when looking in the mirror. Participants in the GIR condition were asked to revisit a recent negative event which left them feeling bad about themselves as a person e.g., a relationship breakdown, social rejection or emotional neglect. Participants were then asked to trace back their memories to identify the earliest memory that was associated with that bad feeling about the body or self, and write about this early event in the first person, describing it in as much detail as possible, as if it were happening to them here and now.

Observing (five minutes). Participants were asked to imagine and then write about the same memory (i.e., the earliest event) but from an observer's point of view (i.e., in the third person), watching what happened to their younger self as it unfolded. Prompts were provided at the end of the writing task for participants to reflect upon what needed to happen in order for the younger self to feel better or if there was anything the adult self would like to do to help the younger self in that situation.

Rescripting (five minutes). Participants were then asked to re-imagine the same event in the first person, but this time the wiser and more compassionate adult self was with them and could intervene in the situation. Participants were asked to write about what happened this time with the adult compassionate self's presence in as much detail as possible.

Psychoeducation. After undergoing step 1 from either BIR or GIR, participants in the psychoeducation condition received a handout that contained four sections: "the role of genetics in eating disorders," "the gene-environment interaction," "how eating disorders affect the brain" and "what does all this mean for recovery?" Woven within these sections was the information that eating regularly was helpful e.g., "When a person is malnourished, their brain is not adequately fuelled, and this may mean they struggle to make decisions, solve problems and regulate their emotions." "The good news is that the effects of starvation can be reversed with adequate re-nourishment," and "With adequate re-nourishment and learning, the brain and body can return to healthy functioning." Participants were then presented with a short quiz which consisted of seven multiple-choice questions and one open-ended question that were designed to help them engage in the reading. Sample quiz questions were, "Based on the reading, do you have to have psychological problems or trauma for an eating disorder to develop? Is recovery from an eating disorder possible? Which one of the following statements describe how genes and environment interact in the case of eating disorders? Now it's your chance to tell us what you've learned from the handout."

Participants were asked to spend not less than 10 minutes on this task and could only proceed if they had answered the multiple-choice questions correctly based on the handout.

Control. After undergoing step 1 from either BIR or GIR, participants in the control condition received instruction to let their mind wander for 10 minutes.

All participants received relevant referral and support information relevant to any concerns about weight, shape or eating at the end of their laboratory session. Furthermore, a reminder card about the one-week follow-up survey was given to participants to take home. BIR or GIR participants received an additional instruction to complete step 3 of the IR procedure daily online for a week. They also received daily reminders to complete their home practice. The link to home practice and the follow-up survey was sent to participants' email addresses.

Measures

We selected measures assessing the following constructs: disordered eating (global eating pathology and number of occasions of ED behaviors in the previous month), body image flexibility, self-compassion, fear of self-compassion, dysfunctional attitudes considered in this study to reflect negative core beliefs, confidence (i.e., "If you decided to work on improving the way you feel about your body, how confident are you that you would succeed?"), perfectionism and state negative affect and body image. ***Table 1*** provided the Cronbach's Alphas of the measured used in this study and all measures are described in detail in **Chapter 3**. The body image flexibility questionnaire (i.e., BI-AAQ) which measures the impact weight has on life, or the overvalued nature of weight and appearance, was highly correlated in the present study with the two items in the Eating Disorders Examination Questionnaire (EDE-Q; Fairburn & Beglin, 1994) that assess the importance of shape and weight combined ($r = .74$, $p < .001$).

Table 1. Cronbach's αs of study measures at baseline and one-week follow up.

Measures	**Cronbach's αs**
Eating Disorder Examination-Questionnaire (EDE-Q; Fairburn & Beglin, 1994)	α = .85-.90
Body Image Acceptance & Action Questionnaire (BI-AAQ; Sandoz et al., 2013)	α = .92-.95
Self-Compassion Scale – Short Form (SCS-SF; Raes et al., 2011)	α = .83-.85
Fear of Self-Compassion (FSC) Scale (Gilbert et al., 2011)	α = .93-.95
Dysfunctional Attitude Scales Short Form 1 (DAS-SF1; Beevers et al., 2007)	α = .85-.86
Clinical Perfectionism Questionnaire (Fairburn et al., 2003b)[1]	α = .78-.86
Positive and Negative Affect Schedule (PANAS; Watson et al., 1988).	α = .87-.92
Body Image States Scale (BISS; Cash et al., 2002)	α = .70-.89

Notes. [1] item 2 and 8 (reversed items) in the CPQ were omitted.

Fidelity

For IR, a quality rating scale was adapted from the scale used in Pennesi and Wade (2018) to assess intervention fidelity at step 3 of the IR intervention (see **Appendix E** Quality Rating Scale). The final fidelity score was obtained by taking the mean of independent ratings by two raters of a random sample (10 from each group, 29%-32%). This score ranged from zero to 12 for both groups of IR, with the higher score indicating greater fidelity. The number of home practices completed by participants was also recorded. Participants were instructed to do one home practice per day for one week, hence the possible range was zero to seven.

The fidelity of the psychoeducation group was assessed using the written summary in the "reading quiz" together with participants' responses to the question, "Did reading about the materials provided a week ago in the lab session change your thinking/behaviours in any way during the past week" in the follow-up survey. Common themes were identified in order to provide information on what participants found helpful in the reading.

Statistical analyses

Power. Power was calculated for longitudinal designs with attrition (Hedeker et al., 1999) with a two-tailed α of 0.05, two assessment points (with baseline serving as a covariate), attribution rates of 10% and a fixed autoregressive coefficient of 0.50. An enrolled sample size of 34.5 per group (total of 138 people) would provide 80% power at two-sided $p<0.05$ to detect a between group effect size difference of 0.60 for the Global EDE when comparing IR and control (Pennesi & Wade, 2018).

Missing data. Of the 130 participants in the analytic sample, 11 (8.46%) did not complete the one-week follow-up (T4) questionnaire (three from BIR, three from GIR, five from control). Little's (1988) Missing Completely At Random (MCAR) test was run with each couplet of trait variables (e.g., EDE-Q at T1 and T4) and each triplet of state variables

(e.g., BISS at T1, T2 and T3) to investigate whether data was missing at random. Logistic regression was conducted to identify baseline predictors of non-completion of T4 questionnaires. Multiple Imputation was used to replace missing observations.

Baseline comparisons. Differences between groups at baseline were tested using Chi-square analyses (for nominal variables such as ethnicity) and analysis of variance (ANOVA; for ratio variables such as BMI). Effect sizes (ES) for any between-group differences at baseline were calculated using Cohen's *d*, where 0.2=small, 0.5=moderate, and 0.8=large.

Experiment manipulation. Linear Mixed Modelling was used to compare the change in state variables among groups i.e., 4 (condition) x 2 (time: T2, T3), with T1 baseline observations used as a covariate to ensure that any observed effects were due to the condition as opposed to variation in baseline scores or measurement error. Three participants (2%) did not complete T2 state measures.

Change in outcome over time. One-way analyses of covariances (ANCOVAs) were used to compare the effectiveness of the four conditions with respect to trait variables at T4. Baseline observations and cash/credit status were included as covariates. Effect sizes and confidence intervals were calculated based on the estimated means and standard errors at T4 between each two conditions for both completers and intent to treat - group. Bonferroni's correction was applied for multiple comparisons.

Results

Baseline data

Means and standard deviations are shown in ***Table 2***: 61.5% participants were within the normal BMI range; 3.8% were classified as underweight (i.e., BMI < 18.5); 23.1% were classified as overweight; 11.5% were classified as obese. Most participants (93.8%) reported engaging in some form of disordered eating behaviours: binge eating (70.8%), driven

exercise (69.2%), fasting (59.2%), self-induced vomiting (14.6%), and laxative misuse (10%). The majority of participants (73.8%) received an EDE-Q Global score that was higher than the clinical cut-off (i.e., >= 2.77, norm for young adult females +1 SD; Mond et al., 2006, p.53). Mean WCS for this sample (M = 68.82, SD = 12.77) was well above the cut-off (i.e., 47) indicating a high risk of developing an ED.

Table 2. Descriptive statistics at baseline (T1) and comparison among group differences at T1 using one-way ANOVA

Variables	Whole sample Mean (*SD*)	Body IR Mean (*SD*)	General IR Mean (*SD*)	Psychoeducation Mean (*SD*)	Control Mean (*SD*)	F (*p* value)
Weight concerns	68.82 (12.77)	68.29 (12.77)	67.10 (11.72)	68.38 (11.25)	71.72 (15.34)	0.73 (.53)
Age	20.79 (2.18)	20.55 (1.79)	21.40 (2.46)	20.93 (2.14)	20.28 (2.30)	1.54 (.21)
BMI	24.35 (4.94)	24.16 (4.95)	24.21 (4.04)	25.53 (6.19)	23.37 (4.09)	1.01 (.37)
Trait						
Disordered eating	3.46 (1.07)	3.58 (1.08)	3.42 (1.09)	3.18 (0.93)	3.69 (1.16)	1.42 (.24)
Eating disorder behaviours	18.54 (15.50)	18.80 (12.28)	21.45 (17.54)	13.71 (2.26)	20.70 (18.30)	1.69 (.17)
Body image acceptance	3.46 (1.18)	3.17 (1.09)	3.70 (1.06)	3.87 (1.06)	3.10 (1.38)	3.63 (.02)
Self-compassion	2.54 (0.61)	**2.36 (0.55)**	**2.75 (0.55)**	2.74 (0.61)	2.31 (0.62)	5.22 (<.001)
Fear of self-compassion	1.64 (0.91)	1.93 (0.89)	1.40 (1.00)	1.37 (0.84)	1.86 (0.80)	3.73 (.01)
Dysfunctional attitudes	2.46 (0.57)	**2.64 (0.56)**	**2.27 (0.53)**	2.32 (0.62)	2.61 (0.47)	3.97 (.01)
Perfectionism	2.51 (0.52)	2.63 (0.59)	2.33 (0.62)	2.43 (0.37)	2.62 (0.42)	2.60 (.55)
Confidence	5.00 (1.98)	5.00 (2.04)	5.00 (1.53)	5.15 (1.83)	4.83 (2.49)	0.13 (.94)
State						
Negative affect	1.98 (0.75)	1.96 (0.72)	1.85 (0.73)	**1.81 (0.65)**	**2.34 (0.84)**	3.36 (.02)
State body image	3.54 (1.15)	3.41 (1.44)	3.61 (0.91)	3.67 (0.90)	3.45 (1.30)	0.37 (.78)

Note. T1 = baseline; IR = imagery rescripting; SD = standard deviation; BMI = body mass index. Based on Bonferroni post-hoc comparisons, groups that demonstrated significant differences from each other were bolded.

Missing data

Little's (1988) MCAR test revealed that participants' body image flexibility scores at T4 were not missing at random (see ***Table 3***). Furthermore, logistic regression revealed that participants' reimbursement status, body image flexibility and perfectionism predicted dropout rates. Those who were reimbursed by credits (B = -2.32, df = 1, p <.001), who had less body image flexibility (B = -0.87, df = 1, p = 0.01), and higher perfectionism (B = 1.61, df = 1, p = 0.02) at baseline were less likely to complete T4 assessments, even though five of the six IR participants (83%) who drop out completed homework: four days (n = 1), three days (n = 1), one day (n = 3), and zero day of homework (n=1).

Experimental manipulation (state variables)

Main effects for time were found for both negative affect and state body image, reported in ***Table 4***, with participants more distressed after the negative mood induction, and their distress level decreased to below baseline after the respective interventions (***Figure 2***). No main effects from the conditions or interaction effects were found.

Homework

The number of homework completed exceeded the possible range as some participants did more than one per day: more than seven days (n = 4, 6%), seven days (n = 27, 40.9%), six days (n = 12, 18.2%), five days (n = 7, 10.6%), four days and less (n = 16, 24.2%). No difference was observed between the groups in home practice completion (BIR, M = 5.46, SD = 2.20; GIR, M = 5.71, SD = 1.92; ES = 0.12, 95% CI [-0.36 to 0.61]) nor did the number of home practices completed predict change in outcome measures.

Figure 2. Visual representation of changes in state variables (negative affect and body image) during the lab session.

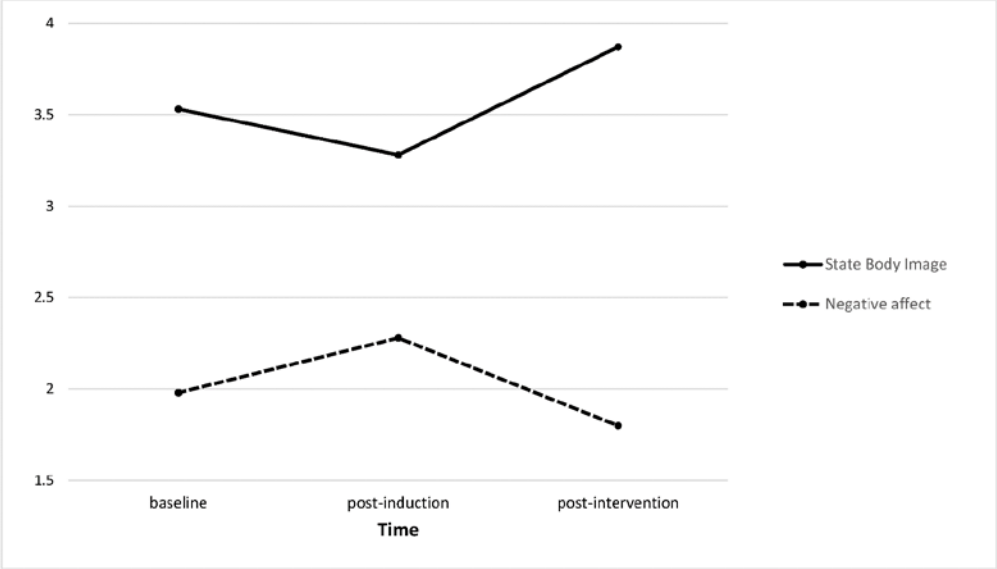


Table 3. Investigation of missing at random and any group differences at baseline predicting dropout using logistic regression

Baseline variables	Little's MCAR test chi-square (*p*)	Logistic regression, baseline variables predicting dropout OR (95% CI) *p*
Credit/Cash	-	**0.11 (0.02, 0.55) .01**
Body mass index	-	1.04 (0.92, 1.16) .56
Weight concerns	-	1.02 (0.97, 1.07) .52
Eating disorder behaviors	-*	1.03 (0.99, 1.06) .11
Disordered eating	3.69 (.06)	1.91 (0.96, 3.72) .06
Body image flexibility	**9.00 (<.001)**	**0.35 (0.17, 0.73) .01**
Self-compassion	2.71 (.10)	0.41 (0.14, 1.20) .10
Fear of self-compassion	2.93 (.09)	1.60 (0.80, 3.22) .19
Dysfunctional attitudes	1.53 (.22)	2.00 (0.67, 5.97) .22
Perfectionism	**6.23 (.01)**	**5.00 (1.36, 18.42) .02**
Confidence	0.09 (.76)	1.05 (0.77, 1.44) .75

Note. OR = Odd Ratio. *could not be computed

Table 4. Linear Mixed Models estimated marginal means for state variables (negative affect and body image) by Time (2) and Condition (4).

Variables	Baseline	Post- induction/ Pre-intervention (T2)				Post-intervention (T3)				Main effects, F (df), *p*		Interaction F (df), *p*
		Body IR	General IR	Psycho -Ed	Control	Body IR	General IR	Psycho -Ed	Control	Time	Condition	Time x Condition
Negative affect	1.97	2.30	2.28	2.23	2.26	1.83	1.78	1.70	1.83	85.58 (125.73), <.001	0.29 (125.06), .83	.17 (125.75), .92
Body image	3.53	3.16	3.35	3.29	3.31	3.79	3.88	4.05	3.74	50.26 (125.74), <.001	0.40 (125.82), .75	0.75 (125.75), .53

Change over time (one-week variables)

Table 5 shows the estimated means and standard errors for one-week measures at T4 and ***Table 6*** shows the effect sizes and 95% confidence intervals between the groups. Separate analyses were conducted for the completers and intent to treat groups. For completers, significant decreases in global eating psychopathology and increases in body image flexibility were detected in both IR groups and psychoeducation compared to the control condition, with psychoeducation producing the largest response. No significant effects were observed among ED behaviors or perfectionism by any group. However, psychoeducation did not impact any non-disorder-specific variables, whereas BIR significantly increased self-compassion compared to psychoeducation and control groups and decreased fear of self-compassion compared to the control group. In addition, GIR significantly decreased the level of dysfunctional attitudes compared to the control group and increased confidence compared to the psychoeducation group. None of the above confidence intervals crossed zero, which indicated their significance, and they exhibited robust differences of moderate to large effect.

Intent to treat analyses demonstrated similar patterns except BIR did not show significant change compared to control for disordered eating and self-compassion (but its superiority remains when compared to psychoeducation) nor did GIR on body image flexibility. The between-group effect sizes exhibited robust differences of moderate to large effect.

Fidelity

Inter-rater reliability

Inter-rater reliability was high in both conditions as indicated by the overall intra-class correlation (ICC; r = .90). There were no significant differences between groups in fidelity for negative mood induction and for the IR compassion step (BIR, M = 10.26, SD = 1.54;

GIR, *M* = 9.52, *SD* = 2.67; ES = 0.35, 95% CI [-.14, 0.83]). The overall fidelity score did not predict change in outcome measures in either condition.

Adherence to instructions

Fourteen participants (10.77%) did not follow IR instructions in choosing the relevant type of memory to recall during negative mood induction: five (16%) in GIR; four (12%) in psychoeducation, and 5 (17%) in control. These participants chose to rescript a body-related event in the general condition (except 2 in control). These cases were rated by the same rating scale. Analyses were repeated after deleting the five cases in GIR who rescripted body-related memories. This is because GIR is the only group where the rescripting instruction determines the condition and entails homework. Resulting effect sizes and confidence intervals are provided in the supplementary table. The pattern of results remained the same, except for completers BIR significantly reduced fear of self-compassion compared to GIR.

Table 5. Estimated means (and standard errors) at one-week follow up (T4), controlling for baseline (T1) variables and participants reimbursement status (i.e., credit/cash) among completers and intent to treat (ITT) group.

	Completers (N = 119)					**Intent to Treat (N = 130)**				
Variables	**Baseline covariate**	**Body IR (n = 32)**	**General IR (n = 28)**	**Psycho-Ed (n = 34)**	**Control (n = 25)**	**Baseline covariate**	**Body IR (n = 35)**	**General IR (n = 31)**	**Psycho-Ed (n = 34)**	**Control (n = 30)**
Global eating psychopathology	3.41	3.04 (0.13)	3.01 (0.14)	2.94 (0.13)	3.48 (0.15)	3.46	3.10 (0.12)	3.06 (0.13)	2.98 (0.12)	3.47 (0.13)
Eating disorder behaviors	17.87	12.31 (2.28)	15.00 (2.48)	14.59 (2.24)	17.72 (2.62)	-	-	-	-	-
Body image acceptance	3.56	4.04 (0.16)	4.02 (0.17)	4.14 (0.15)	3.46 (0.18)	3.46	3.95 (0.15)	3.93 (0.15)	4.08 (0.15)	3.44 (0.16)
Self-compassion	2.57	2.83 (0.07)	2.63 (0.08)	2.53 (0.07)	2.59 (0.08)	2.54	2.79 (0.06)	2.62 (0.07)	2.52 (0.07)	2.58 (0.07)
Fear of self-compassion	1.60	1.36 (0.10)	1.63 (0.10)	1.59 (0.10)	1.80 (0.11)	1.64	1.41 (0.09)	1.66 (0.09)	1.62 (0.09)	1.81 (0.10)
Dysfunctional attitudes	2.45	2.46 (0.06)	2.29 (0.07)	2.45 (0.06)	2.58 (0.07)	2.46	2.47 (0.06)	2.32 (0.06)	2.46 (0.06)	2.57 (0.07)
Perfectionism	2.47	2.41 (0.08)	2.48 (0.09)	2.51 (0.08)	2.63 (0.09)	2.51	2.44 (0.07)	2.51 (0.08)	2.54 (0.07)	2.64 (0.08)
Confidence	4.98	5.32 (0.26)	5.95 (0.28)	4.71 (0.26)	5.52 (0.30)	5.00	5.33 (0.24)	5.90 (0.26)	4.74 (0.24)	5.50 (0.26)

Note. Participants' reimbursement status is a covariate in all analyses

Table 6. Between group effect sizes, Cohen's *d* (and confidence interval, 95% CI) at one-week follow-up (T4), controlling for baseline (T1) variables and participants reimbursement status (i.e., credit/cash) among completers (upper diagonal for each variable) and intent to treat group (bottom diagonal for each variable).

	Body IR	**General IR**	**Psycho-Ed**	**Control**
		Global eating psychopathology		
Body IR	-	0.04 (-0.47, 0.55)	0.16 (-0.35, 0.62)	**0.60 (0.07, 1.14)**
General IR	0.06 (-0.43, 0.54)	-	0.09 (-0.41, 0.60)	**0.64 (0.09, 1.20)**
Psycho-Ed	0.17 (-0.30, 0.65)	0.11 (-0.37, 0.60)	-	**0.73 (0.20, 1.26)**
Control	**0.53 (0.03, 1.02)**	**0.58 (0.07, 1.09)**	**0.71 (0.20, 1.21)**	-
		Body Image Acceptance		
Body IR	-	0.02 (-0.48, 0.53)	0.11 (-0.37, 0.60)	**0.65 (0.12, 1.19)**
General IR	0.02 (-0.46, 0.51)	-	0.14 (-0.36, 0.64)	**0.63 (0.08, 1.19)**
Psycho-Ed	0.15 (-0.32, 0.62)	0.14 (-0.35, 0.63)	-	**0.78 (0.25, 1.23)**
Control	**0.59 (0.09, 1.09)**	**0.58 (0.07, 1.09)**	**0.74 (0.24, 1.25)**	-
		Self-compassion		
Body IR	-	0.50 (-0.02: 1.0.1)	**0.76 (0.26, 1.26)**	**0.61 (0.08, 1.15)**
General IR	0.46 (-0.03, 0.95)	-	0.24 (-0.26, 0.75)	0.10 (-0.44, 0.64)
Psycho-Ed	**0.72 (0.23, 1.20)**	0.25 (-0.23, 0.74)	-	0.15 (-0.67, 0.37)
Control	**0.58 (0.08, 1.08)**	0.11 (-0.40, 0.61)	0.15 (-0.34, 0.65)	-
		Fear of self-compassion		
Body IR	-	0.50 (-0.01, 1.02)	0.41 (-0.08, 089)	**0.80 (0.26,1.34)**
General IR	0.49 (0.00, 0.98)	-	0.07 (-0.43, 0.57)	0.32 (-0.22, 0.86)
Psycho-Ed	0.40 (-0.07, 0.88)	0.08 (-0.41, 0.57)	-	0.38 (-0.14, 0.90)
Control	**0.75 (0.25, 1.26)**	0.29 (-0.21, 0.80)	0.36 (-0.13, 0.86)	-
		Dysfunctional Attitudes		
Body IR	-	0.49 (-0.03, 1.00)	0.03 (-0.45, 0.51)	0.36 (-0.17, 0.88)
General IR	0.44 (-0.05, 0.93)	-	0.45 (-0.05, 0.96)	**0.82 (0.26, 1.38)**
Psycho-Ed	0.03 (-0.44, 0.50)	0.42 (-0.08, 0.91)	-	0.38 (-0.14, 0.90)
Control	0.28 (-0.21, 0.77)	**0.71 (0.19, 1.23)**	0.31 (-0.19, 0.80)	-
		Perfectionism		
Body IR	-	0.15 (-0.35, 0.66)	0.22 (-0.26, 0.71)	0.50 (-0.03, 1.03)
General IR	0.17 (-0.32, 0.65)	-	0.06 (-0.44, 0.57)	0.33 (-0.21, 0.87)
Psycho-Ed	0.25 (-0.23, 0.72)	0.07 (-0.42, 0.56)	-	0.27 (-0.25, 0.78)
Control	0.48 (-0.02, 0.97)	0.30 (-0.21, 0.80)	0.24 (-0.25, 0.73)	-
		Confidence		
Body IR	-	0.43 (-0.08, 0.95)	0.41 (-0.07, 0.90)	0.14 (-0.39, 0.66)
General IR	0.40 (-0.08, 0.89)	-	**0.84 (0.32, 1.36)**	0.29 (-0.25, 0.84)
Psycho-Ed	0.42 (-0.05, 0.90)	**0.83 (0.32, 1.34)**	-	**0.55 (0.02, 1.07)**
Control	0.12 (-0.37, 0.61)	0.28 (-0.22, 0.79)	**0.55 (0.05, 1.05)**	-

Note. Cells are bolded when 95% CIs do not cross zero, which indicate the significance of effect sizes.

Thematic content. In the psychoeducation condition, the most common themes extracted from participants' written responses in relation to what they learnt from the handout included: genetics play a role in EDs and genes and environment interact (mentioned in 65% of the responses); EDs can impact the functioning of the brain (44%); recovery from an ED is possible (38%); adequate nutrition is important (21%); and the cause of an ED varies (18%). Over half (53%) of the participants said the reading material changed their thinking and/or behaviors in the past week.

BIR example. An example from the BIR condition (all names were altered and identifying information omitted) is provided below. At the first step (reliving), the participant wrote: "I'm with my family at home and I try on a new outfit that someone bought for me. The clothes fit but I'm a little plump and my tummy shows a little. They remark that my body isn't suitable for this type of clothes and that my sister looks better in it. I'm upset and cry when they say that but all they do is laugh it off and say I'm being silly. I think to myself, why am I not good enough for this? And how can I make myself worthy enough to dress however I want?"

At the second step, the participants wrote: "I see Kim trying on a new outfit that someone bought for her. She is very happy that someone bought her a gift. But when she steps out, the rest of the family laughs at her because she is slightly plump, and her tummy is showing a little. The adults say the outfit doesn't suit her body type and her sister would look so much better in it. Kim cries and says it's not fair but the adults in the room laugh it off and say she's being silly. They don't know why she is so serious because she's just 6 years old. Grace looks disappointed that her gift turned out like that."

At the third step (rescripting) the participant wrote: "I come out of the room in the new outfit. The adults in the room say my body type isn't suitable and the outfit doesn't look good. They say that the outfit would look better on my sister. I cry and ask why it is so unfair,

but older Kim is there and tells me not to be bothered by what they say. If they say the outfit doesn't look good then find a way to make it work. Older Kim also says that people can be judgemental and there will always be negative opinions from others. It doesn't matter what they think so long as I am happy. And I can always buy a nicer outfit myself. When I am older, no one can decide what I want to wear any more. It isn't worth it to cry over the opinions of others."

GIR example. An example from the GIR condition for the first step is as follows: "I am 11 years old and I am playing with a girl as part of childcare. She comes up to me and asks me if all Indians stink. I don't know how to answer. I defensively say no but afterwards I get really ashamed of how I stink. I feel insecure about the food I eat, thinking my mouth stinks or that it is my food that is making me sweat and stink. I keep thinking about it and now I feel insecure around people because I'm scared they will think I stink. I stay away from that girl in case she asks me again or in case she tells me that I stink. I'm sure I will cry if I have to hear that again. I also stay away from her friends in case she told her friends about my smell too."

At the second step the participant wrote: "I see Anika playing red rover with everyone. She is standing next to another girl with blond hair. The blond girl asks Anika whether all Indians stink. Anika looks distressed and a little angry. She says no harshly and leaves the blond girl's side. After hearing that, Anika may be sad, she may be thinking about whether the girl meant to say that Anika stinks. She may feel self conscious about her body and her sweatiness. I think that the girl didn't necessarily mean that Anika stinks. She may just mean to ask if the smell is common amongst Indians. It is important to understand that Anika does not stink all the time. She may stink now because she was running around and playing. She also doesn't have to be conscious about the food she eats thinking it may affect her general smell."

For the third step she wrote: “I am at the oval playing red rover and a girl comes up to me. She asks if all Indians stink. I get angry and sad at the same time, thinking that she thought I stunk. I say no really fast and leave. Older Anika hears this conversation and talks to me about it. I confess about my newly developed insecurities about my smell and it relating to the food I eat. Older Anika tells me that she thinks that was a rude thing for the girl to say. She doesn't think that the girl meant to offend me severely. Older Anika tells me that the girl didn't necessarily mean that I stink. The girl may just mean to ask if the smell is common amongst Indians. It is important to understand that I do not stink all the time. I may stink now because I was running around and playing. I also don’t have to be conscious about the food I eat because it is delicious food and I should be proud of my culture. Older Anika also reassures me that my food will not make me stink.”

Discussion

The participants in this study showed high levels of ED psychopathology, with around three in four having clinically significant levels. Our completer analyses showed all three interventions were associated with significant improvements in global eating psychopathology and body acceptance compared to control, with psychoeducation showing the largest improvement. In addition, only the BIR group showed significant improvements on self-compassion and fear of self-compassion compared to both psychoeducation and control and only the GIR group showed significant improvement on dysfunctional attitudes (clinical perfectionism and low self-esteem) compared to control, and increased confidence compared to psychoeducation. Our intent-to-treat findings had slightly less robust findings with respect to the IR conditions, with only improved global eating psychopathology for the GIR group and improved body image flexibility for the BIR group. Additionally, BIR was found to improve self-compassion only compared to psychoeducation (but not control).

A major limitation of this study includes the missingness of participants' follow-up data, which did not occur at random (i.e., those who had less body image flexibility were less likely to complete their one-week follow-up survey), despite data showing engagement in the study through completing some homework. Overall, there was a very small non-completion rate, 8.5%, and around half of the participants who did not complete the one-week follow-up were from the control group, which did not entail homework. Results related to body image flexibility should be interpreted with caution. Second, the length of follow-up (i.e., one week) is short which limited our ability to infer long-term benefits of imagery rescripting and psychoeducation in this study. As the EDE-Q measured disordered eating psychopathology and ED behaviors in the past four weeks, this could result in a floor effect and explain a lack of significant findings in ED behaviors.

In sum, the present findings suggest both imagery rescripting and psychoeducation were able to enact changes among important ED related measures in a high-risk population who might otherwise not commence treatment. The next study addresses the question of whether a combination of the two might be more powerful than one or the other used in isolation.

Supplementary Table 1. Between group effect sizes, Cohen's *d* (and confidence interval, 95% CI) at one-week follow-up (T4), controlling for baseline (T1) variables and participants reimbursement status (i.e., credit/cash) among completers (*N* = 119; upper diagonal for each variable) and intent to treat group (*N* = 130; bottom diagonal for each variable) after deleting five cases of GIR that rescripted body-related memories.

	Body IR	**General IR**	**Psycho-Ed**	**Control**
		Global eating psychopathology		
Body IR	-	0.01 (-0.49, 0.52)	0.15 (-0.33, 0.63)	**0.60 (0.07, 1.14)**
General IR	0.06 (-0.42, 0.55)	-	0.13 (-0.37, 0.63)	**0.60 (0.04, 1.14)**
Psycho-Ed	0.16 (-0.31, 0.63)	0.09 (-0.40, 0.58)	-	**0.74 (0.21, 1.27)**
Control	0.46 (-0.03, 0.96)	**0.51 (0.003, 1.02)**	**0.71 (0.20, 1.21)**	-
		Body Image Acceptance		
Body IR	-	0.03 (-0.47, 0.54)	0.14 (-0.35, 0.62)	**0.65 (0.12, 1.19)**
General IR	0.06 (-0.42, 0.54)	-	0.17 (-0.33, 0.67)	**0.60 (0.05, 1.16)**
Psycho-Ed	0.14 (-0.62, 0.33)	0.19 (-0.29, 0.69)	-	**0.80 (0.27, 1.34)**
Control	**0.54 (0.04, 1.04)**	0.45 (-0.06, 0.96)	**0.71 (0.20, 1.21)**	-
		Self-compassion		
Body IR	-	**0.52 (0.01, 1.04)**	**0.75 (0.26, 1.26)**	**0.59 (0.05, 1.12)**
General IR	0.42 (-0.07, 0.91)	-	0.22 (-0.28, 0.72)	0.05 (-0.49, 0.59)
Psycho-Ed	**0.66 (0.18, 1.15)**	0.18 (-0.31, 0.67)	-	0.18 (-0.34, 0.69)
Control	0.43 (-0.06, 0.92)	0.02 (-0.48, 0.52)	0.22 (-0.28, 0.71)	-
		Fear of self-compassion		
Body IR	-	**0.53 (0.02, 1.05)**	0.41 (-0.08, 0.89)	**0.80 (0.26, 1.34)**
General IR	0.44 (-0.04, 0.93)	-	0.12 (-0.38, 0.62)	0.25 (-0.29, 0.79)
Psycho-Ed	0.29 (-0.18, 0.77)	0.15 (-0.33, 0.64)	-	0.38 (-0.15, 0.90)
Control	**0.65 (0.15, 1.15)**	0.18 (-0.32, 0.69)	0.34 (-0.15, 0.84)	-
		Dysfunctional Attitudes		
Body IR	-	0.49 (-0.03, 1.00)	0.06 (-0.42, 0.54)	0.33 (-0.20, 0.85)
General IR	0.45 (-0.04, 0.94)	-	0.42 (-0.08, 0.93)	**0.79 (0.23, 1.35)**
Psycho-Ed	0.08 (-0.39, 0.55)	0.41 (-0.08, 0.90)	-	0.38 (-0.14, 0.90)
Control	0.19 (-0.30, 0.68)	**0.62 (0.11, 1.14)**	0.28 (-0.21, 0.78)	-
		Perfectionism		
Body IR	-	0.24 (-0.27, 0.75)	0.22 (-0.26, 0.71)	0.50 (-0.03, 1.03)
General IR	0.23 (-0.26, 0.71)	-	0.02 (-0.48, 0.52)	0.24 (-0.30, 0.78)
Psycho-Ed	0.22 (-0.26, 0.67)	0.02 (-0.47, 0.51)	-	0.27 (-0.25, 0.78)
Control	0.40 (-0.09, 0.89)	0.16 (-0.34, 0.67)	0.19 (-0.30, 0.68)	-
		Confidence		
Body IR	-	0.38 (-0.13, 0.89)	0.41 (-0.07, 0.90)	0.13 (-0.40, 0.65)
General IR	0.40 (-0.08, 0.89)	-	**0.77 (0.25, 1.29)**	0.24 (-0.29, 0.79)
Psycho-Ed	0.42 (-0.05, 0.90)	**0.83 (0.32, 1.33)**	-	**0.53 (0.01, 1.06)**
Control	0.12 (-0.37, 0.61)	0.28 (-0.22, 0.79)	**0.55 (0.05, 1.05)**	-

Note. Cells are bolded when 95% CIs do not cross zero, which indicate the significance of effect size

CHAPTER 5: COMBINING PSYCHOEDUCATION WITH IMAGERY RESCRIPTING (STUDY 2)

Abstract

Objective: Imagery rescripting has been shown to increase self-compassion among body-dissatisfied young females, while having smaller effect size changes related to disordered eating and body image when compared to psychoeducation. The current study investigated the combined usage of psychoeducation (the effect that eating disorders have on the brain and the importance of regular eating) and imagery rescripting to determine if this was more effective than they are used alone. **Method:** Young body-dissatisfied females with disordered eating (N = 100) were randomly assigned to one of the four conditions; imagery rescripting and psychoeducation combined, imagery rescripting only, psychoeducation only, and control. Participants initially received a brief intervention in the lab (pre-COVID, N=41), while after the onset of the COVID pandemic (N = 59), all study procedures were conducted online. Assessment of disordered eating, body image acceptance, self-compassion and fear of self-compassion was conducted at baseline and 1-week follow up. **Results**: Between pre- and during-COVID, there was a significant increase in weight concerns, global eating psychopathology, and state negative affect and body image dissatisfaction of participants entering the trial. Based on between group effect sizes, both the combination and imagery rescripting conditions were helpful in increasing participants' self-compassion pre-COVID. During COVID, only the combination condition resulted in an increase in participants' body image acceptance. **Discussion**: COVID impacted the pattern of results in this study. Combination did not result in a pervasive effect (i.e., on both disordered eating and self-compassion) as hypothesized and imagery rescripting may not be effective under high stress.

Keywords: Imagery rescripting, Psychoeducation, Disordered eating, Body dissatisfaction, Self-compassion.

Introduction

The last study (see **Chapter 4**) showed that the psychoeducation approach, which emphasized "malleable biology", was effective in decreasing participants' disordered eating and improving body image flexibility within one week with a bigger effect size than the two imagery rescripting approaches (Zhou et al., 2020). However, its impact was limited as it did not create change among participants in other important psychological variables, such as self-compassion, that predicts better treatment outcomes in people with eating disorders (EDs) (Kelly et al., 2014).

Accumulating evidence has highlighted the importance of the epigenetic process in the development of EDs (Steiger & Booij, 2020). The environment (including nutrition) can impact and modify the expression of certain genes through DNA methylation (Steiger & Booij, 2020) to promote recovery. Psychoeducation that has taken a hopeful message of "malleable biology" has been shown to decrease shame and stigma surrounding EDs among patients (Michael et al., 2020), and improve optimism and self-efficacy among patients with EDs (Farrell et al., 2015). Despite its benefits, psychoeducation may not be adequate to support long term change in disordered eating behaviours. Imagery rescripting, on the other hand, improved self-compassion and decreased fear of self-compassion in addition to their impact on disordered eating, which may help maintain decreases in disordered eating.

Hence the objective of this study is to investigate the combined usage of imagery rescripting and psychoeducation that emphasizes "malleable biology" to maximize the respective strengths of both approaches. We selected the Body Imagery Rescripting (BIR) approach specifically for its impact on self-compassion which we deemed as more pertinent to this population (Kelly et al., 2014). Our outcome variables included global eating psychopathology, body image flexibility, self-compassion and fear of self-compassion. We hypothesize that psychoeducation will decrease disordered eating and increase body

acceptance, and imagery rescripting will improve self-compassion and decrease fear of self-compassion (replicating previous findings in **CHAPTER 4**), and that combining them will yield improvements on all four variables.

Over the conduct of the study, COVID-19 emerged and the associated lockdowns. This gave us a unique opportunity to investigate the impact of COVID on the interventions, and to examine the conditions under which these interventions may have optimal impact. Specifically, during COVID-19, researchers have raised concerns that people with EDs are at significant risk for increased symptomology (e.g., Cooper et al., 2020; Rodgers et al., 2020). For example, using retrospective reporting, Phillipou et al. (2020) found that a general population in Australia increased their restricting and binge eating behaviours during COVID-19, whereas those who had an ED history increased not only their restricting, binge eating but also purging and exercise behaviours. In addition, qualitative retrospective research has found that those who experienced disordered eating tend to report similar themes such as an increase in ED symptoms, need for help and support, limited access to services during COVID-19 (Brown et al., 2021; Nutley et al.,, 2021; Richardson et al., 2020). To date, only one study has used a prospective design to report on the impact of COVID on disordered eating, where college students in the US recorded no significant change in weight, BMI, or BMI category, between January and April 2020, but over this time the subjective descriptions of weight changed to significantly be more likely to fall into a higher category (Keel et al., 2020). These researchers suggest the advent of COVID may introduce some cognitive distortions about people's perception of their weight and body shape which could impact the effectiveness of our interventions. Various factors (e.g., overall stress, change in routine, access to food) may impact participants' well-being and response to interventions. Hence, we will also take advantage of such design of convenience to investigate whether COVID

impacted participants eating pathology and whether COVID impacted the effectiveness of disordered eating interventions such as psychoeducation and imagery rescripting.

Method

Participants

Females aged 17 years or older were recruited from the Flinders University School of Psychology research participation pool. Participants were reimbursed by course credits. Inclusion criteria required meeting a score of 47 or above on the Weight Concerns Scale (WCS; Killen et al., 1994, p. 232), considered to have good predictive validity for development of an eating disorder (Jacobi et al., 2011; Killen et al., 1994; Killen et al., 1996). Sample questions include 'how afraid are you to gain 3 pounds (1.36 kg)', "Compared to other things in your life, how important is your weight to you?", and "Do you ever feel fat?" Participants were not assessed with respect to eating disorder diagnosis. The analytic sample for this study included 100 females ranging in age from 17 to 26 (*Mean* = 19.85, *SD* = 2.01) with a mean body mass index (BMI) in the normal range (*M* = 25.52, *SD* = 6.16; World Health Organization, 2006). Most participants self-reported as Caucasian (88%) with the next largest groups being Asian (6%), and other (6%).

Design

This study, advertised as "an investigation of new methods to improve body image among young females", was approved by Social and Behavioural Research Ethics Committee (#8041). There were five occasions of assessment. Initially participants attended a research laboratory for a 60-minute session at Flinders University, where they completed baseline questionnaires (Time 1 [T1]) and received their randomly assigned conditions. Due to the introduction of physical distancing requirements of COVID-19, data collection was suspended until April 15th, 2020 when the laboratory session was adapted to an online format where participants could complete the questionnaires and interventions at home. For the

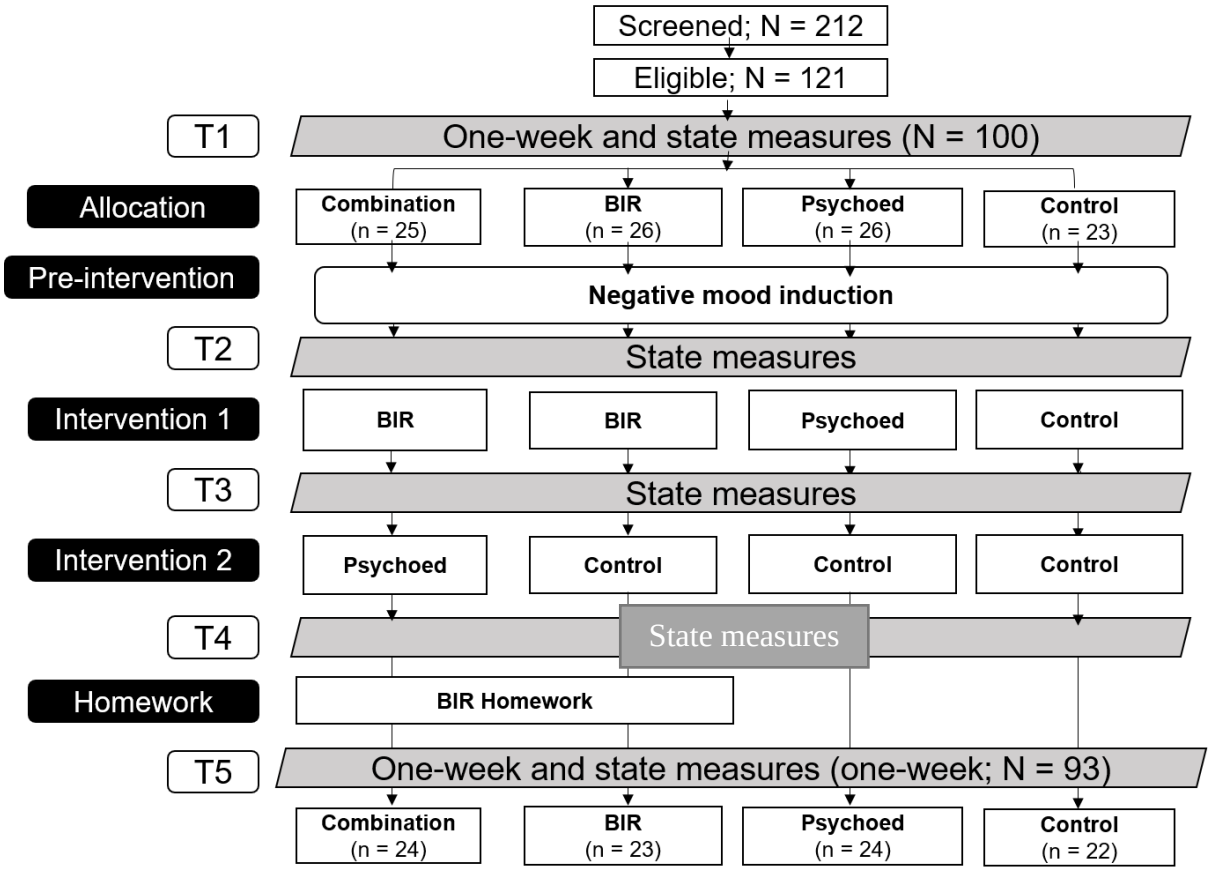
purpose of this paper, we will refer to the two timeframes as pre- or during-COVID. The differences of study designs between two timeframes were minimal: (1) a research assistant measured participants' height and weight for BMI calculation pre-COVID; participants self-report their height and weight online during-COVID; (2) the presence of a research assistant in the study pre-COVID who had minimal contact with participants, limited to welcoming them to the study and being present to answer any questions. The rest of questionnaires, study instructions and interventions were exactly the same as they were all delivered online.

Participants were first randomly assigned by the Qualtrics Survey Flow, to one of the four conditions (see ***Figure 1***): (1) body imagery rescripting combined with psychoeducation (Combination), (2) body imagery rescripting (BIR) alone, (3) psychoeducation (PE) alone, and (4) control. Then all participants receive a body-specific negative mood induction where participants were prompted to recall a negative body memory related to how they feel about their body or eating now (e.g., being teased about body shape in the past) and were assessed again with state measures (Time 2 [T2]).

Participants from each condition then underwent their respective online interventions. To balance the time spent on interventions for participants in each condition, the combination participants first received BIR and then the psychoeducation intervention; the BIR group and PE group first received their interventions followed by a control activity (i.e., let your mind wander for 10 minutes), and finally, the control group received two blocks of control activity to match the time other participants spent on interventions (i.e., 20 mins) see ***Figure 1.***

Between each block of intervention state measures were administered again (Times 3 [T3] and 4 [T4]). At this stage all participants were provided with a feedback sheet with contact information of support services included. The link to home practice and the one-week follow-up survey (Time 5 [T5]) was sent to participants' email addresses to be completed online.

Figure 1. Study design.



Interventions

Body imagery rescripting (10 minutes)

Combination and BIR participants were asked to imagine and write about the same memory they wrote about during negative mood induction, first from an observer's point of view watching what happened to their younger self as it unfolded. Then they were asked to reflect upon what needs to happen for the younger self to feel better or if there was anything the adult self would like to do to help the younger self in that situation. Finally, they re-imagined the same event in the first person, but this time a wiser and more compassionate adult self was with them and could intervene in the situation (later referred to as the compassionate step of IR). Participants were instructed to write about what happened this

time with the adult compassionate self's presence in as much detail as possible. For instance, the adult self could offer physical comfort (e.g., a hug) or protection (e.g., fighting off the bully), or informative advice based on what they now know, or do anything (not confined by reality) that feels helpful in the situation.

Psychoeducation

These participants were informed on the computer screen that their screening questionnaires indicated an increased level of weight concern which can be a risk factor for ED, hence they are invited read a handout about EDs and consider its relevance. The Centre for Clinical Interventions handout was used, entitled "eating disorder and neurobiology" in which "the role of genetics in eating disorders," "the gene-environment interaction," "how eating disorders affect the brain" and "what does all this mean for recovery?" were discussed. The main takeaway message woven in these sections is that eating regularly was helpful. Participants were then presented with a short quiz which consisted of seven multiple-choice questions and one open-ended question that were designed to help them engage in the reading. Participants were asked to spend not less than 10 minutes on this task and could only proceed if they had answered the multiple-choice questions correctly based on the handout.

Control

Participants were asked to just sit and let their mind wander for 10 minutes.

Measures

The validated measures were selected to assess the following constructs: disordered eating (global eating pathology and number of occasions of eating disorder behaviors in the previous month), body image acceptance, self-compassion, fear of self-compassion, and state negative affect and body image. These measures were described in **Chapter 3.** State negative affect and body image were measured to examine the success of the experimental

manipulation (i.e., negative mood induction). ***Table 1*** provided the Cronbach's Alphas of the measured used in this study.

Table 1. Measures included in the study, with internal consistency (Cronbach's α) at T1, T2 and T3 (for states measures) and T4 (state measures).

Measures	**Cronbach's αs**
Eating Disorder Examination-Questionnaire (EDE-Q; Fairburn & Beglin, 1994)	α = .84-.87
Body Image Acceptance & Action Questionnaire (BI-AAQ; Sandoz et al., 2013)	α = .93-.96
Self-Compassion Scale – Short Form (SCS-SF; Raes et al., 2011)	α = .78-.80
Fear of Self-Compassion (FSC) Scale (Gilbert et al., 2011)	α = .93-.96
Positive and Negative Affect Schedule (PANAS; Watson et al., 1988).	α = .89-.93
Body Image States Scale (BISS; Cash et al., 2002)	α = .78-.90

Statistical analyses

Baseline differences

Differences between groups at baseline were tested using Chi-square analyses (for nominal variables such as ethnicity) and analysis of variance (ANOVA; for ratio variables such as BMI). Differences were also compared between participants who entered the study before the online procedure put in place due to COVID pandemic and those entered the study after using ANOVA.

Missing data

Of the 100 participants in the analytic sample, 7 (7%) did not complete the one-week follow-up questionnaire (three from BIR, two from Psychoed, one from combination, and one

from control). Logistic regression was conducted to identify baseline predictors of non-completion of T5 questionnaires. Expectation maximization was used to replace missing observations. Bonferroni's correction was applied for multiple comparisons.

Experimental manipulation

Linear Mixed Modelling was used to compare the change in state variables among groups i.e., 4 (condition) x 3 (time: T2, T3, T4), with T1 baseline observations used as a covariate to ensure that any observed effects were due to the condition as opposed to variation in baseline scores or measurement error.

Change in outcome over time

ANCOVAs were used to compare the effectiveness of the four conditions with respect to outcome variables at one-week, adjusting for baseline observations and BMI. The moderators investigated were condition and COVID status (pre- and during-COVID). Between group effect sizes and confidence intervals were calculated based on the estimated means and standard errors differences at one-week between each two conditions using an intent to treat approach. Within group effect sizes and 95 % confidence intervals were calculated to demonstrate the magnitude of change, accounting for the correlation between the two measures (Lenhard & Lenhard, 2016), using the online effect size calculator for repeated measures: https://www.psychometrica.de/effect_size.html#repeated).

Results

Baseline data

Means and standard deviations at baseline by conditions or pre-/during COVID are shown in ***Table 2***. Most participants (53%) were within the normal BMI range (i.e., 18.5 < BMI < 25); 27% were classified as overweight (i.e., 25 < BMI < 30); 17% were obese (i.e., BMI > 30), and 3% were classified as underweight (i.e., BMI < 18.5). Most participants (92%) reported engaging in some form of disordered eating behaviours over the previous 28

days: fasting (71%), driven exercise (71%), binge eating (65%), self-induced vomiting (13%), and laxative misuse (7%). The clinical cut-off on the EDE-Q Global score (i.e., >= 2.77, norm for young adult females +1 SD; Mond et al., 2006) was attained by 76% of participants. Mean WCS was 68.48 (*SD* = 12.85; scores beyond 47 were identified as at-risk). Forty-one participants entered the study pre-COVID and 59 during-COVID.

Differences at baseline between condition and COVID timing

Overall, no significant differences among baseline variables were found when comparing the four conditions without considering COVID impact. However, significant differences were found among those who did the study pre- and during-COVID, regardless of condition. The latter group had significantly higher symptomology compared to the former, all associated with moderate effect sizes. Specifically, the two groups differed in weight concerns, global eating psychopathology, and state negative affect and body image. After adjusting for baseline negative affect, the difference in global eating psychopathology remained (see ***Table 2***). The percentage of participants who reported disordered eating behaviours increased during COVID: fasting (from 61% to 78% of participants), binging (61% to 68%), vomiting (7% to 17%), and driven exercise (66% to 75%).

Table 2. Descriptive statistics (Mean and Standard Deviation) at baseline by condition or by the time period enrolled in the research study (i.e., pre or during COVID). Effect sizes and 95% confidence intervals were provided for pre- and during COVID mean comparisons.

Variables	Whole sample (N = 100)	Combination (n = 25)	Body IR (n = 26)	Psychoeducation (n = 23)	Control (n = 23)	Pre-COVID (n = 41)	During COVID (n = 59)	Cohen's *d* (95% CI) COVID timing	Cohen's *d* (95% CI) After adjusting for negative affect
Weight concerns	68.48 (12.85)	68.13 (13.58)	68.27 (11.28)	67.24 (12.75)	70.50 (14.36)	65.04 (10.48)	70.88 (13.86)	**0.46 (0.06, 0.87)**	0.36 (-0.04, 0.76)
Age	19.85 (2.01)	19.80 (1.89)	20.31 (2.27)	19.56 (1.86)	19.72 (2.03)	19.93 (1.93)	19.80 (2.08)	0.06 (-0.33, 0.46)	0.15 (-0.25, 0.55)
BMI	25.52 (6.16)	25.84 (7.44)	27.22 (6.74)	25.32 (5.98)	23.47 (3.17)	26.86 (5.73)	24.58 (6.32)	0.37 (-0.02, 0.78)	**0.43 (0.03, 0.83)**
Global eating psychopathology	3.64 (1.10)	3.58 (1.12)	3.82 (0.99)	3.49 (1.13)	3.66 (1.21)	3.29 (1.02)	3.88 (1.10)	**0.55 (0.15, 0.96)**	**0.40 (0.01, 0.80)**
Body image acceptance	3.34 (1.24)	3.35 (1.12)	3.28 (1.35)	3.35 (1.22)	3.38 (1.32)	3.59 (1.24)	3.16 (1.21)	0.35 (-0.05, 0.75)	0.18 (-0.22, 0.58)
Self-compassion	2.53 (0.48)	2.52 (0.53)	2.51 (0.56)	2.47 (0.37)	2.63 (0.46)	2.59 (0.51)	2.49 (0.46)	0.21 (-0.19, 0.61)	0.07 (-0.33, 0.47)
Fear of self-compassion	1.60 (0.85)	1.46 (0.77)	1.58 (0.95)	1.61 (0.87)	1.80 (0.83)	1.54 (0.86)	1.65 (0.85)	0.13 (-0.27, 0.53)	0.12 (-0.28, 0.51)
State									
Negative affect	2.24 (0.86)	2.28 (0.77)	2.37 (1.04)	2.05 (0.67)	2.29 (0.94)	2.04 (0.83)	2.38 (0.86)	**0.40 (0.00, 0.80)**	-
State body image	3.51 (1.29)	3.62 (1.11)	3.58 (1.40)	3.62 (1.35)	3.17 (1.28)	3.84 (1.42)	3.27 (1.14)	**0.48 (0.05, 0.86)**	-

Note. IR = imagery rescripting; SD = standard deviation; BMI = body mass index. Bond font indicates a significant difference between pre/during COVID. All the effect sizes are shown as absolute values reflecting the magnitude of difference between pre- and during COVID.

Missing data

Logistic regression revealed that one pre-randomization variable of the twelve tested (***Table 3***), lower self-compassion, predicted non-completion of follow-up data, suggesting a chance finding (1/12, *p*=.08). Post-randomisation state variables predicted non-completion as well (i.e., negative affect at T2, T3, and T4, state body image at T2). That is, higher negative affect and body dissatisfaction after negative mood induction (T2) and higher negative affect after the interventions (T3 and T4), was associated with a higher rate of non-completion of questionnaires irrespective of conditions (***Table 3***).

Table 3. Investigation baseline variables predicting dropout using logistic regression.

Baseline variables	**OR (95% CI)**
Setting (lab or at home)	4.53 (.52, 39.13)
# of homework completed	.90 (.59, 1.37)
Body mass index	.88 (.73, 1.08)
Weight concerns	1.03 (.97, 1.09)
Global eating psychopathology	1.63 (.75, 3.54)
Body image acceptance	.48 (.21, 1.08)
Self-compassion	**1.32 (.19, .91)**
Fear of self-compassion	1.53 (.61, 3.76)
Negative affect (T1)	2.21 (.91, 5.34)
Negative affect (T2)	**2.55 (1.07, 6.05)**
Negative affect (T3)	**3.86 (1.39, 10.78)**
Negative affect (T4)	**2.81 (1.11, 7.17)**
State body image (T1)	.51 (.24, 1.09)
State body image (T2)	**.47 (.22, .98)**
State body image (T3)	.52 (.26, 1.05)
State body image (T4)	.53 (.27, 1.02)

Note. OR = Odd Ratio; Bold font indicates significance. The empty cells are due to data only collecting once at baseline hence missingness is irrelevant. Bond font indicates a significant chi-square value or odd ratio, *$p < .05$. T1 = baseline (pre-negative mood induction); T2= post negative mood induction; T3= post 1st intervention; T4= post 2nd intervention.

Table 4. Estimated marginal means (standard errors) controlling baseline observation and BMI for a moderator (two levels: pre- and during-COVID) and without a moderator (shaded areas) among intent to treat group.

Intent to treat (N = 100)													
Variables		**COM (n = 25)**			**BIR (n = 26)**			**Psycho-Ed (n = 26)**			**Control (n = 23)**		
	Baseline covariate	**Pre-COVID**	**During COVID**	**COM Overall**	**Pre-COVID**	**During COVID**	**BIR Overall**	**Pre-COVID**	**During COVID**	**PE Overall**	**Pre-COVID**	**During COVID**	**Control Overall**
Global eating psychopathology	3.64	**3.63 (0.26)[1]**	**2.94 (0.21)[1]**	3.22 (0.17)	3.28 (0.25)	2.91 (0.21)	3.10 (0.16)	3.11 (0.25)	3.43 (0.21)	3.29 (0.16)	3.30 (0.27)	3.10 (0.22)	3.15 (0.17)
Body image acceptance	3.40	**3.61 (0.27)[2]**	**4.66 (0.23)[2]**	4.22 (0.18)	4.15 (0.27)	4.07 (0.24)	4.09 (0.18)	4.06 (0.26)	4.04 (0.24)	4.05 (0.18)	3.67 (0.28)	3.65 (0.24)	3.69 (0.19)
Self-compassion	2.56	2.71 (0.11)	2.56 (0.09)	2.62 (0.07)	2.78 (0.11)	2.70 (0.09)	2.72 (0.07)	2.65 (0.10)	2.70 (0.09)	2.68 (0.07)	2.40 (0.11)	2.53 (0.09)	2.49 (0.07)
Fear of self-compassion	1.61	1.91 (0.18)	1.49 (0.14)	1.66 (0.11)	1.44 (0.17)	1.38 (0.14)	1.42 (0.11)	1.41 (0.17)	1.44 (0.15)	1.42 (0.11)	1.60 (0.19)	1.58 (0.15)	1.57 (0.12)

Notes. Bond font indicates a significant effect size between pre/during COVID within condition: [1]Cohen's d = 0.60, 95% CI (0.03,1.16); [2]Cohen's d = 0.85, 95% CI (0.28,1.43).

Change in state variables

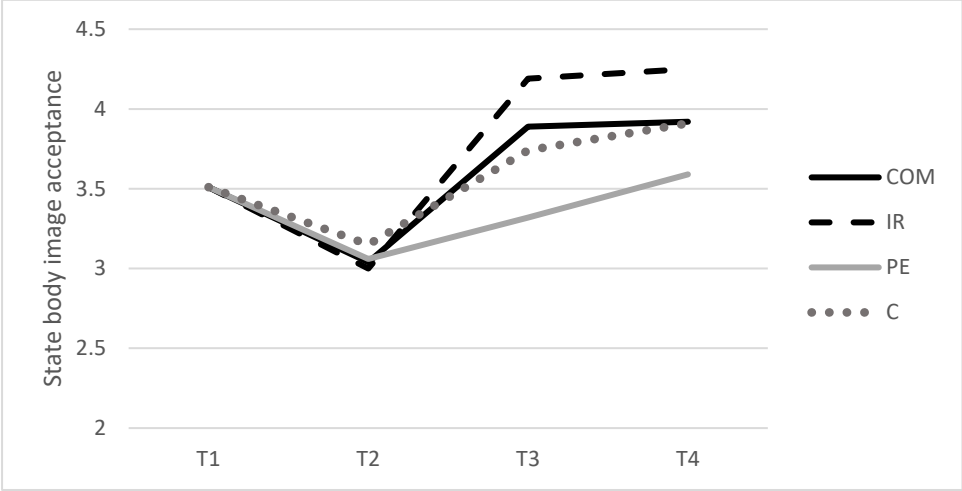
Significant main effects for time were found for both negative affect and state body image, reported in ***Table 5***. Participants had higher negative affect and lower body image acceptance after the negative mood induction, suggesting the experimental manipulation was achieved. And these levels decreased to below baseline after the respective interventions. There were no main effects for condition and no interaction effect for negative affect. The only significant interaction between time and condition was found for state body image (shown in ***Figure 2.***). BIR showed significantly better state body image compared to psychoeducation at T3, despite no significant differences among conditions at T2.

Table 5. Linear Mixed Models estimated marginal means for state variables (negative affect and body image) by Time (3) and Condition (4).

Variables	Baseline covariate	Post-induction/ Pre-intervention 1 (T2)				Post-intervention 1 (T3)				Post-intervention 2 (T4)				Main effects, F (df), *p*		Interaction F (df), *p*
		COM	BIR	PE	C	COM	BIR	PE	C	COM	BIR	PE	C	Time	Condition	Time x Condition
NA	2.24	2.54	2.53	2.36	2.61	1.89	1.85	2.04	1.96	1.84	1.53	1.86	1.75	**57.15 (94.76), <.01**	.51 (93.30), .67	228.83 (74.13), <.01
BI	3.51	3.04	3.00	3.06	3.15	3.89	4.19	3.32	3.74	3.92	4.24	3.59	3.91	**35.67 (94.52), <.01**	2.41 (94.18), .07	**2.33 (101.86), .04**

Notes. NA = Negative affect, BI = (state) Body image, COM = Combination, BIR = Body imagery rescripting, PE = psychoeducation, C = control.

Figure 2. State body image acceptance across time (3) by condition (4).



Change over follow-up

Table 3 shows the overall estimated means and standard errors for one-week measures at follow-up among all intent-to-treat (IIT) participants (N = 100) and separately at two levels of the moderator, pre- and during-COVID. ***Table 6*** and ***Figure 3*** shows the between-group effect sizes and 95% confidence intervals pre/during COVID. ***Figure 4*** shows the within-group effect sizes and 95% confidence intervals between the conditions pre/during COVID.

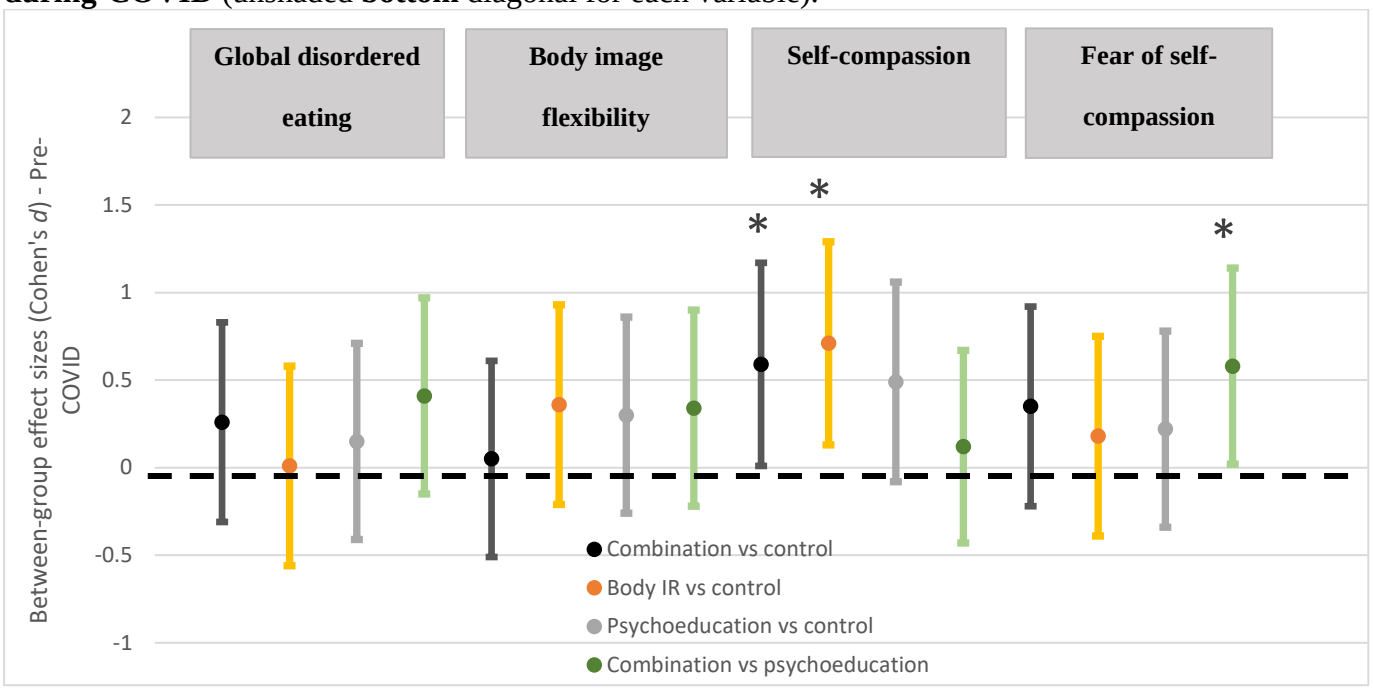
Table 6. Between group effect sizes, Cohen's *d* (and confidence interval, 95% CI) at one-week follow-up (T5), controlling for baseline (T1) variables and BMI (*N* = 100) between two levels of the moderator: **pre-COVID** (i.e., shaded **upper diagonal** for each variable) and **during-COVID** (unshaded **bottom** diagonal for each variable).

	Combination	**Body IR**	**Psycho-Ed**	**Control**
		Global eating psychopathology		
Combination	-	0.28 (-0.27, 0.83)	0.41 (-0.14, 0.97)	0.26 (-0.31, 0.83)
Body IR	0.03 (-0.52, 0.58)	-	0.14 (-0.41, 0.68)	0.01 (-0.55, 0.58)
Psycho-Ed	0.47 (-0.09, 1.03)	0.50 (-0.05, 1.05)	-	0.15 (-0.41, 0.72)
Control	0.15 (-0.41, 0.72)	0.18 (-0.38, 0.74)	0.32 (-0.25, 0.88)	-
		Body Image Acceptance		
Combination	-	0.40 (-0.15, 0.96)	0.34 (-0.21, 0.90)	0.05 (-0.52, 0.61)
Body IR	0.51 (-0.05, 1.07)	-	0.07 (-0.48, 0.61)	0.36 (-0.21, 0.93)
Psycho-Ed	0.53 (-0.03, 1.09)	0.03 (-0.52, 0.59)	-	0.30 (-0.27, 0.86)
Control	**0.89 (0.30, 1.49)**	0.33 (-0.23, 0.90)	0.36 (-0.21, 0.93)	-
		Self-compassion		
Combination	-	0.13 (-0.42, 0.68)	0.12 (-0.43, 0.67)	**0.59 (0.01, 1.17)**
Body IR	0.31 (-0.24, 0.87)	-	0.25 (-0.30, 0.79)	**0.71 (0.13, 1.29)**
Psycho-Ed	0.31 (-0.24, 0.87)	0.00 (0.00, 0.00)	-	0.49 (-0.08, 1.06)
Control	0.07 (-0.50, 0.64)	0.38 (-0.18, 0.96)	0.38 (-0.18, 0.96)	-
		Fear of self-compassion		
Combination	-	0.54 (-0.02, 1.10)	**0.58 (0.02, 1.14)**	0.35 (-0.22, 0.92)
Body IR	0.16 (-0.39, 0.71)	-	0.04 (-0.51, 0.58)	0.18 (-0.38, 0.75)
Psycho-Ed	0.10 (-0.48, 0.62)	0.08 (-0.46, 0.63)	-	0.22 (-0.34, 0.78)
Control	0.13 (-0.44, 0.70)	0.29 (-0.28, 0.85)	0.19 (-0.37, 0.75)	-

Note. Cells are bolded when 95% CIs do not cross zero, which indicate the significance of effect sizes. All the effect sizes are shown as absolute values reflecting the magnitude of difference between groups without direction (see Table 3 for specific means for comparison).

Both pre- and during-COVID, between group effect sizes showed that interventions that contained BIR (either combination and/or BIR alone) produced improvements in self-compassion or body image acceptance. Specifically, pre-COVID both combination and BIR increased participants' self-compassion compared to control. During-COVID, the combination condition improved participants' body image acceptance than control. Note that the combination condition also increased participants' fear of self-compassion compared to psychoeducation only at pre-COVID (***Figure 3***), suggesting while imagery rescripting may improve self-compassion, when combined with "malleable biology" information it may create more barriers to practise self-compassion in the future.

Figure 3. Between group effect sizes, Cohen's *d* (and confidence interval, 95% CI) at one-week follow-up (T5), controlling for baseline (T1) variables and BMI (N = 100) between two levels of the moderator: **pre-COVID** (i.e., shaded **upper diagonal** for each variable) and **during-COVID** (unshaded **bottom** diagonal for each variable).



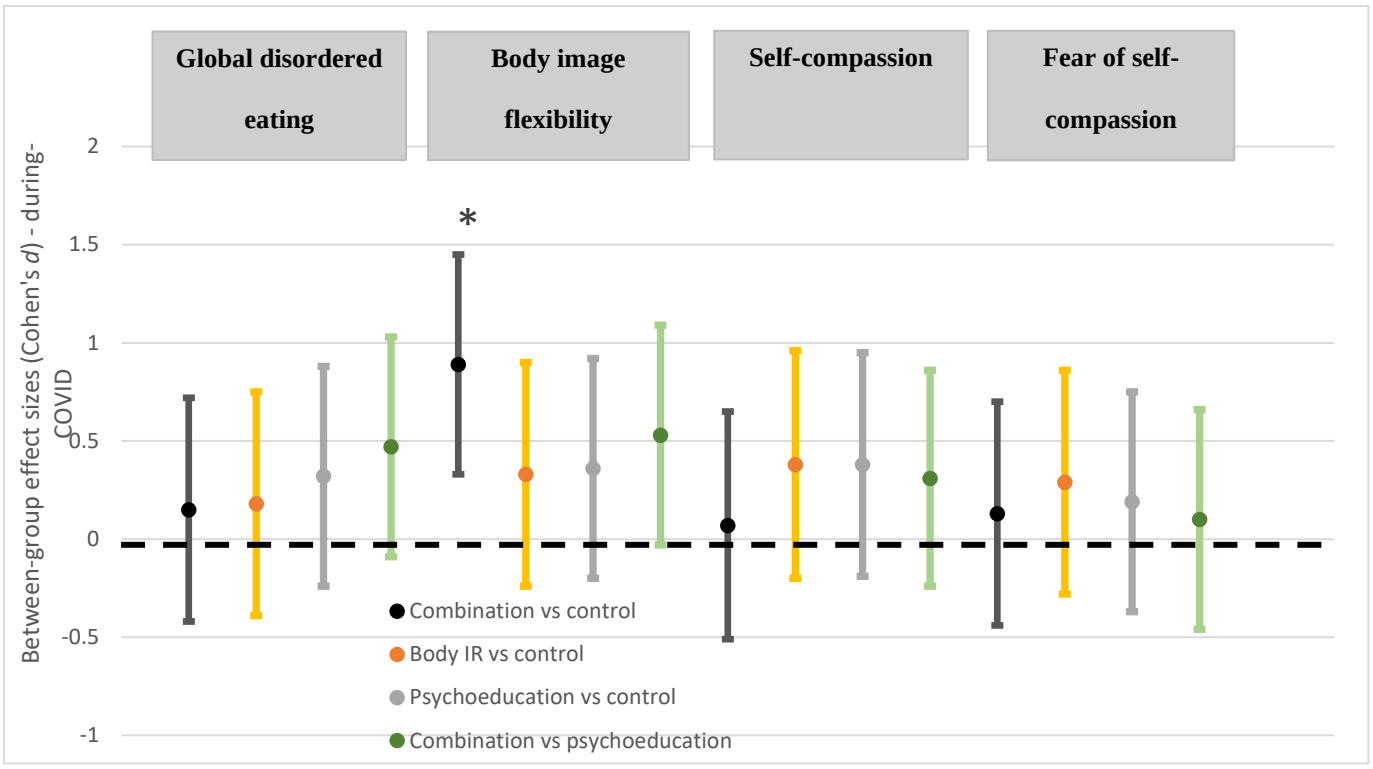
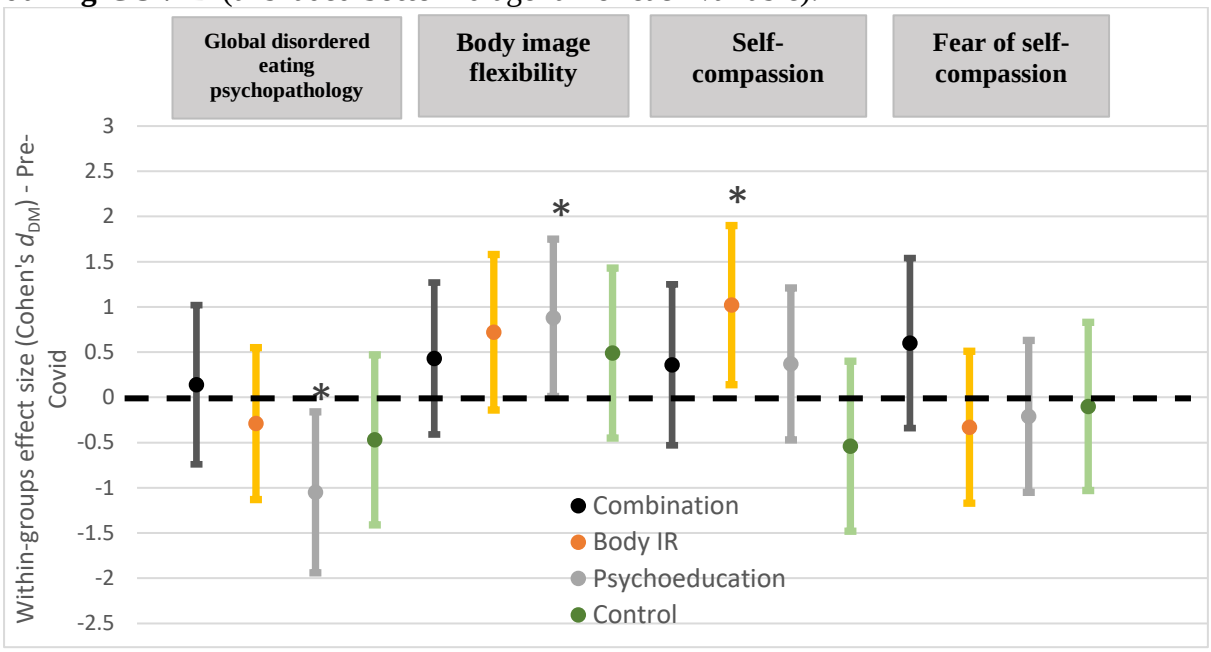
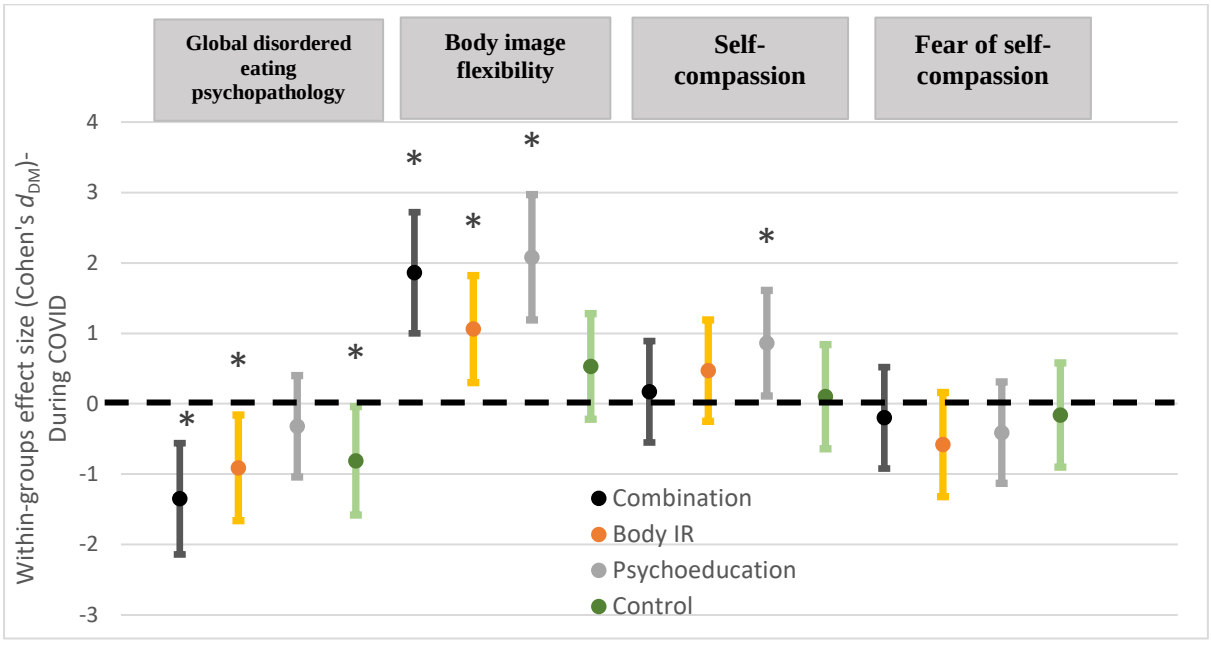


Figure 4. Within group effect sizes, Cohen's *d* (and confidence interval, 95% CI) at one-week follow-up (T5), controlling for baseline (T1) variables and BMI (N = 100) between two levels of the moderator: **pre-COVID** (i.e., shaded **upper diagonal** for each variable) and **during-COVID** (unshaded **bottom** diagonal for each variable).





Notes. The within-group effect sizes show both magnitude and the direction of change. A negative effect size indicates the score decreased at one-week follow-up compared to baseline, a postivie effect size indicates the score increase.

Within-group effect sizes were examined in order to place these complex findings in context. First, pre-COVID psychoeducation had the strongest effect on disordered eating

specific variables (i.e., global eating psychopathology and body image acceptance) and BIR increased self-compassion among participants. Second, the combination group did not show any significant within-group effect sizes. Third, during-COVID it seemed that participants found all conditions helpful such that combination, BIR, and even control showed a decreased EDE-Q global score at follow-up. In addition, all three active interventions increased participants' body image acceptance at follow-up. These findings may reflect a floor effect i.e., baseline observations were higher in these variables compared to pre-COVID which render differences easier to detect. Finally, few significant effects were found among self-compassion and fear of self-compassion during-COVID except that psychoeducation increased self-compassion during COVID.

COVID impact on interventions overall

As results were complex and that our sample size in each group shrunk further when data were divided based on COVID timing, we understand that the statistical power was very limited to substantiate our observations. However, it seems clear that COVID did impact participants symptomology and the pattern of results. Therefore, we decided to collapse all active groups (i.e., combination, imagery rescripting only and psychoeducation only) and compared their effectiveness to control using Linear Mixed Modelling (LMM) adjusting for baseline negative affect i.e., 2 (condition) x 2 (time: baseline, one-week) x 2 COVID timeframe (pre- and during COVID).

Linear mixed modelling (**Table 7)** revealed that main effects of time were observed for disordered eating and body image flexibility, suggesting that there was a decrease in disordered eating and increase in body image flexibility overtime regardless of condition. Main effects of time were not observed for self-compassion and fear of self-compassion. No main effect of condition was observed for any outcome variables.

Table 7. Linear Mixed Models estimated marginal means and standard error for one-week variables by Time (2), Condition (2) and COVID (2) controlling for baseline negative affect.

	Baseline		**One week**		**Within group ES (95% CI)**	
Variables	Control	Active	Control	Active	Control	Active
Pre-COVID observations						
	n = 9	n = 32	n = 9	n = 31		
EDEQ	3.51 (0.32)	3.37 (0.17)	3.19 (0.40)	3.14 (0.21)	-0.50 (-1.44, 0.44)	-0.34 (-0.83, 0.15)
BIAAQ	3.60 (0.41)	3.58 (0.22)	3.89 (0.51)	4.11 (0.27)	0.53 (-0.41, 1.47)	**0.63 (0.13, 1.14)**
SCS	2.77 (0.16)	2.54 (0.09)	2.58 (0.18)	2.68 (0.10)	-0.44 (-1.37, 0.50)	**0.50 (0.01, 1.00)**
FCS	1.92 (0.24)	1.57 (0.13)	1.90 (0.28)	1.57 (0.15)	-0.08 (-1.01, 0.84)	0 (-0.49, 0.49)
During-COVID observations						
	n = 14	n = 45	n = 13	n = 40		
EDEQ	3.69 (0.26)	3.81 (0.15)	3.07 (0.33)	3.20 (0.18)	**-1.14 (-1.94, -0.34)**	**-0.97 (-1.41, -0.54)**
BIAAQ	3.24 (0.33)	3.14 (0.19)	3.52 (0.41)	4.01 (0.23)	0.43 (-0.32, 1.18)	**1.29 (0.83, 1.74)**
SCS	2.55 (0.13)	2.47 (0.07)	2.54 (0.15)	2.58 (0.08)	-0.03 (-0.77, 0.71)	0.32 (-0.09, 0.74)
FCS	1.65 (0.19)	1.53 (0.11)	1.56 (0.23)	1.37 (0.13)	-0.22 (-0.96, 0.53)	-0.40 (-0.82, 0.01)

Note. Higher EDEQ scores suggest higher level of disordered eating; higher BIAAQ score suggest higher level of body image flexibility; higher SCS score suggest higher level of self-compassion and higher fear of self-compassion score suggest higher level of fear of self-compassion. Bold font indicates a significant difference between baseline and one-week follow-up.

A significant time x condition interaction was observed for self-compassion. Post-hoc analyses suggested that active intervention increased self-compassion significantly over time compared to control without considering COVID impact. No other significant time x condition interaction was observed. No significant interactions between time, condition and COVID status were observed. However, just by observing change in size of within-group effect sizes, changes to within-group effect sizes for disordered eating more than doubled for both online interventions and assessment from pre-COVID to during COVID, and the impact of active interventions on self-compassion reduced over time during COVID compared to pre-COVID.

Discussion

This study investigated the respective effects of three interventions, combination, body imagery rescripting and psychoeducation, compared to control on disordered eating, body image acceptance and self-compassion among university females with disordered eating. First, the results suggest that during-COVID weight concern, disordered eating behaviours, negative affect and negative state body image were significantly higher than pre-COVID. Furthermore, COVID appeared to change pattern of results suggesting the impact of interventions was changed. Second, the combination intervention did not impact across all our variables as hypothesised. For instance, the combination group increased participants' self-compassion pre-COVID compared to control, but its magnitude of change is smaller than when imagery rescripting was used on its own. Further, the combination group resulted in higher fear of self-compassion scores compared to psychoeducation alone at pre-COVID. However, combination did increase participants' body image acceptance during COVID compared to control while the rest did not. Given evidence that the environment impacts on the effectiveness of the interventions, more research is needed to test in what settings combination conditions can be helpful.

There are three main limitations of the current research within which results should be interpreted. First, while this study was powered sufficiently to detect moderation of condition on outcome, it is limited in power to detect the effect of a second moderator, namely COVID status. Second, loss of participants to follow-up assessment was not random, but predicted by higher levels of state negative affect and body image in response to the negative memory induction. This does suggest the usefulness of incorporating a structured debrief post imagery rescripting. The debrief may include asking participants for feedback about the procedure, processing specific rescripting content that is causing distress and use downward arrow technique to uncover core beliefs, incorporate cognitive restructuring of unhelpful beliefs resulting from the images, and returning to the compassionate step where participants can brainstorm alternative perspectives or ideas where he/she can offer to their younger selves. This type of work may best be conducted face-to-face, as would be expected in a therapeutic session to allow for processing such a personalized debrief. Third, the impact of COVID was confounded with the small changes that it caused to the experimental procedure. Whilst we consider these changes insufficient to explain the patterns of changes observed pre- and during-COVID, the impact of COVID on interventions requires further examination.

Given our first two studies focus on young females at risk of disordered eating, we decided that it was important to test imagery rescripting in females with an eating disorder. In this context, imagery rescripting is best evaluated as an adjunct and not a stand-alone treatment, given the risk to individuals participating in the study.

CHAPTER 6: FACE-TO-FACE IMAGERY RESCRIPTING IMAGERY RESCRIPTING (STUDY 3)

Abstract

Objective: Imagery rescripting (IR) has been widely used to treat various mental health problems, however, little is known about its usefulness in eating disorders. The primary aim of this pilot study was to evaluate the feasibility of using a face-to-face imagery rescripting as a treatment adjunct among day patients with an eating disorder. Our secondary aim was to investigate within-group effect size changes between groups in order to ensure the suitability of IR in this population. **Method:** Twelve participants were recruited from the Statewide Eating Disorders Services and were randomly assigned to either treatment as usual (TAU) or treatment as usual plus imagery rescripting (TAU+IR). Participants in the TAU+IR group received a one-hour face-to-face imagery rescripting session with a postgraduate trainee therapist within their first week of treatment. Outcome measures, including psychological distress, eating disorder symptoms, self-compassion and dysfunctional attitudes, were measured at baseline and 4 weeks. **Results:** Overall, feasibility was promising with all participants completing the protocol and assessment once randomised, but no one completed seven days of home practice. Recruitment was slow with less than 50% agreeing to be randomised. TAU demonstrated a quicker reduction in symptoms than the TAU+IR group. **Discussion:** Possible explanations include the timing of the imagery rescripting session was not appropriate for this group of patients, IR has a longer term effect that cannot be observed in merely four weeks, or the current form of imagery rescripting is not appropriate to use with this group of patients. Future research is needed to clarify whether imagery rescripting is indeed appropriate to use for eating disorder patients, and if so, how it can best be delivered (e.g., time point, content, targeted population).

Keywords: Imagery rescripting, Eating disorders, Self-compassion, Disordered eating, feasibility.

Introduction

The results of both Study 1 (**Chapter 4**) and Study 2 (**Chapter 5**) suggest that body imagery rescripting (BIR) can not only improve eating disorder specific outcomes, such as increasing body image flexibility, it also has a consistent positive impact on self-compassion. Further, **Chapter 5** revealed that it may be helpful in some contexts to combine the use of BIR with psychoeducation (such as during COVID), where such combination had an enhanced impact on body image flexibility. The impact of BIR alone on self-compassion during COVID was reduced and reason was yet unclear.

With early evidence that imagery rescripting can be helpful for people experiencing disordered eating in university samples, it is still unclear whether imagery rescripting is helpful in a clinical setting with eating disorder patients when added to other treatment components. Therefore, in this study we piloted a randomized controlled trial at a day program for people diagnosed with an eating disorder. Specifically, the aim of this pilot study is to compare treatment as usual enhanced by imagery rescripting as an adjunct with treatment as usual in terms of treatment outcomes, including global eating psychopathology, general psychological distress (e.g., depression, anxiety and stress) and self-compassion.

Method

Participants

All patients 18 years or older, medically stable, and admitted to the day program at the Statewide Eating Disorder Service (SEDS; South Australia) were invited to participate in this study. The analytic sample for this study included 11 females ranging in age from 19 to 43 (*Mean* = 26.31, *SD* = 7.13) with a mean body mass index (BMI) of 20.83, *SD* = 4.30 (World Health Organization, 2006). Out of the 11 participants, 8 of them (72.73%) had a diagnosis of Anorexia Nervosa (6 restricting subtype and 1 binge/purge subtype), and 3 were diagnosed with Otherwise Specified Feeding and Eating Disorders (OSFED) – Atypical

Anorexia. The diagnoses were decided by the specialist psychiatrist working in the SEDS. Durations of illness ranged from 1 year to 20 years (M = 9.45, SD = 6.73). Most participants had previous inpatient treatments for eating (n = 8; 72.73%), the number of previous inpatient treatments ranged from 0 to 5 (M = 1.73, SD = 1.85).

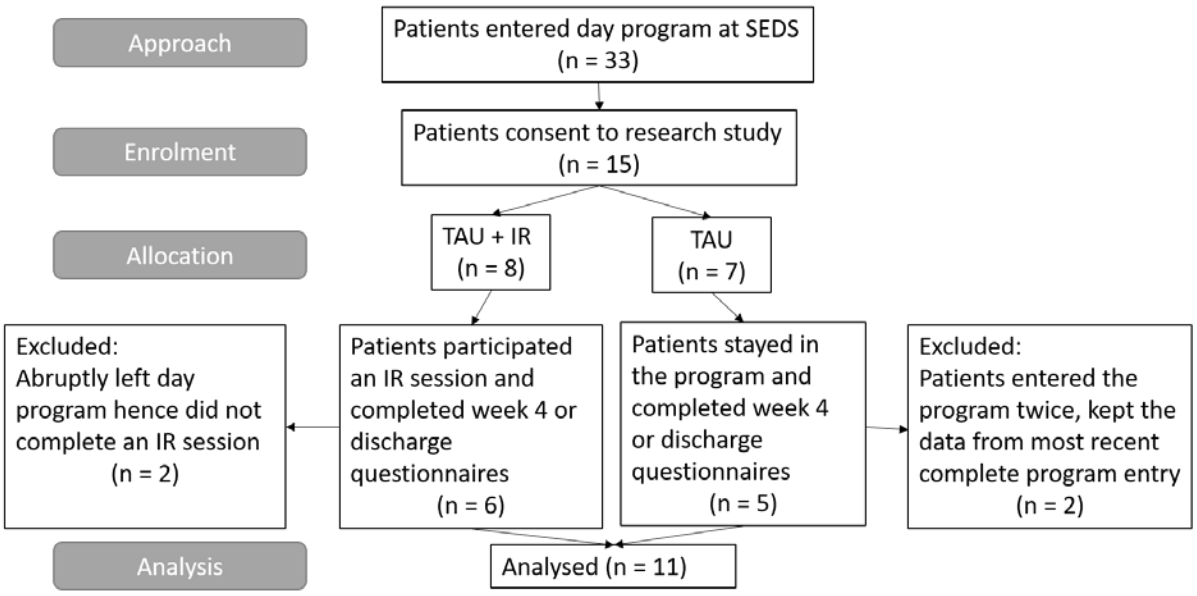
Procedure

This study was approved by the Southern Adelaide Clinical Human Research Ethics Committee (SAC HREC, EC00188) and registered on the Australian New Zealand Clinical Trials Registry (ANZCTR, ACTRN12619000646145). A research flyer was given to all new patients when they first arrived at SEDS for an assessment. Interested participants then signed the research consent form when they were admitted in the day program and completed a routine SEDS baseline questionnaire on iPads. All participants were randomly allocated to either Treatment as Usual plus Imagery Rescripting (TAU+IR) Treatment as Usual (TAU) by the Qualtrics Survey Flow at baseline. A PhD student in Clinical Psychology then contacted those who were allocated to the IR group, made appointments to conduct a one-on-one face-to-face imagery rescripting session for 60 minutes at the end of their first week in the day program (see **Figure 1**). All participants completed routine SEDS questionnaires on the Qualtrics platform at four weeks or at discharge, if this occurred before the first four weeks. The mean duration between baseline and the second occasion of measurement was 28.89 days.

The decision to provide IR early in treatment was informed by research that suggests early change is the most robust predictor of treatment outcomes (Vall & Wade, 2015). Previously, findings from Pennesi and Wade (2018) and Zhou et al. (2020) suggested that after one session of IR, participants have shown an increase in self-compassion and decrease in dysfunctional attitudes within a week. We hypothesized that by enacting changes in those

important maintaining factors, especially self-compassion, better progress would be achieved as suggested in previous treatment studies (Kelly et al., 2014).

Figure 1. Study flow diagram.



Imagery rescripting (60 minutes).

The imagery rescripting followed an adapted script developed by the Centre of Clinical Intervention (CCI) for imagery rescripting (see supplementary materials). First, a short introduction and rationale of imagery rescripting was provided. See below,

> "it is common for people with eating disorders to report that memories of early negative experiences, e.g., being rejected by a friend, are still relevant to how they feel emotionally about their body and eating today…because the original event was very emotionally meaning to us, these images can get 'stuck' in our memories so that they recur as 'echoes' and shape the expectations and images we have about our body and eating now…with imagery rescripting we have the opportunity to go back in our imagination to experience the past event form a new perspective".

Then participants were asked to identify an unpleasant experience that they believe are still relevant how they feel about their body or eating now. After identifying the negative imagery, core beliefs associated with that particular imagery were elicited using the downward arrow technique. After identifying core beliefs, participants were asked to identify the perspective of the older self by thinking about what they now know about the situation that they might not have known at the time and what they could do to intervene to help the younger person. Participants were told that they did not have to conform to reality in this step of imagination. They can be as imaginative as they like (e.g., flying away with their older self), as long as the sense of threat was stopped, and comfort was provided. An imagery rescripting worksheet was filled out by the student therapist collaboratively with patient's input during the session which was photocopied for the patient to keep after the session. All patients who received the imagery rescripting session were offered an online link to practice imagery rescripting for a week, after which participants were asked to provide qualitative feedback of their IR experience.

Measures

The validated measures are listed in ***Table 1*** and described in **Chapter 3**, and were selected to assess the following constructs: psychological distress (e.g., depression, anxiety, and stress), psychosocial impairment due to eating disorder features, disordered eating (global eating pathology and occasions of disordered eating behaviors in the past month), body image acceptance, self-compassion, dysfunctional attitudes and clinical perfectionism. The strength of core beliefs associated with negative events were recorded pre- and post-imagery rescripting on the worksheet (see **Appendix F**) filled out in session. These ratings include beliefs about self (e.g., "I am not worthy"), others (e.g., others are not trust-worthy) and the world (e.g., "the world is not safe"), rated on a 11-point Likert scale where 0 = completely untrue and 10 completely true. Staff and participants were asked to provide feedback of the pilot study at the end of data collection.

Table 1. Measures included in the study with internal consistency (Cronbach's α) at T1 and T2.

Measures	**Cronbach's α**
Depression, Anxiety and Stress Scale (Lovibond & Lovibond, 1995)	Respectively: 0.86-0.96, 0.76-0.84, 0.77-0.91
Clinical impairment (Bohn et al., 2008)	0.95-0.96
Eating Disorder Examination-Questionnaire (Fairburn & Beglin, 1994)	0.97-0.98
Body Image Acceptance & Action Questionnaire (Sandoz et al., 2013)	0.94-0.97
Self-Compassion Scale – Short Form (Raes et al., 2010)	0.85-0.87
Dysfunctional Attitude Scales Short Form 1 (Beevers et al., 2007)	0.87-0.90
Clinical Perfectionism Questionnaire (Fairburn et al., 2003b)	0.67-0.87

Statistical analyses

Differences between groups at baseline were tested using analysis of variance (ANOVA). Linear Mixed Modelling was used to compare the change in variables among groups i.e., 2 (condition) x 2 (time: baseline 4 weeks). All participants were included in the data analyses as linear mixed modelling provides estimation maximization which is a robust way of handling missing data. Within- group effect size (ES) with 95% confidence intervals (CIs) were used to compare relative change in each group, consistent with the New Statistics approach (Cumming, 2013). Within-group ESs were calculated using Cohen's $d_{Repeated\ Measures\ (RM)}$ (Lenhard & Lenhard, 2016), taking the correlations between pre- and post-test into account (Lakens, 2013; Morris & DeShon, 2002).

Results

Descriptive data

Means and standard deviations for the baseline measures are shown in ***Table 2***. Most participants (50%) were classified as underweight (i.e., BMI < 18.5); 33.3% were classified as normal weight, 16.7% were classified as overweight. The clinical cut-off on the EDE-Q Global score (i.e., >= 2.77, norm for young adult females +1 SD; Mond, Hay, Rodgers, & Owen, 2006, p.53) was attained by 82% of participants. Driven exercise was the most common form of disordered eating behavior (83.3%), followed by restricting food intake (50%), laxative misuse (50%), objective binge episodes (23%), and vomiting (8.3%).

Table 2. Descriptive statistics at baseline (T1) and investigation of group differences using one-way ANOVA.

Variables	Whole sample Mean (*SD*)	TAU+IR Mean (*SD*)	TAU Mean (*SD*)	Baseline differences between groups, *F*
Age	26.31 (7.14)	28.86 (8.93)	25.65 (5.16)	.07
BMI	20.53 (4.30)	19.92 (4.06)	21.26 (4.94)	.25
Motivation	78.64 (17.23)	74.00 (14.38)	84.20 (20.33)	.95
Readiness	60.27 (20.64)	60.00 (14.91)	60.60 (28.07)	.002
Confidence	74.00 (16.49)	67.17 (17.81)	82.20 (11.37)	2.64
Depression	1.90 (0.76)	2.29 (0.65)	1.43 (0.65)	4.75 ^{t}
Anxiety	1.44 (0.55)	1.64 (0.70)	1.20 (0.08)	1.92
Stress	1.98 (0.51)	2.40 (0.49)	1.77 (0.39)	5.48 *
Clinical impairment	2.33 (0.60)	2.47 (0.51)	2.17 (0.71)	.65
Global eating psychopathology	4.77 (1.07)	4.88 (0.81)	4.65 (1.42)	.12
Body image acceptance	2.36 (0.76)	2.21 (0.70)	2.55 (0.88)	.52
Self-compassion	2.19 (0.52)	1.79 (0.41)	2.67 (0.39)	13.04 **
Dysfunctional attitudes	2.88 (0.64)	3.28 (0.31)	2.40 (0.62)	9.42 *
Perfectionism	2.77 (0.53)	2.96 (0.44)	2.55 (0.59)	1.74

Note. T1 = baseline; IR = imagery rescripting; TAU = treatment as usual; SD = standard deviation; BMI = body mass index; * $p < .05$, ** $p < .01$, ^{t} $.05 < p < .06$.

Feasibility

Recruitment. This study utilized a passive recruitment strategy without approaching any patients directly (i.e., inserting a research flyer in new patients' intake package). Overall, the recruitment was slow. This study commenced on October 9th, 2019 and last participant was recruited on August 17th, 2020 (1.2 participants per month). Out of the 33 patients who entered the day program during this time, 15 patients (45.45%) provided consent to be contacted for the study (see **Figure 1**). The data collection period coincides with the COVID-19 pandemic which resulted in periods of lower than usual patient intake due to physical distancing requirements. Less than 50% of the new intake agreed to participate in the study.

Randomization. ANOVA revealed that two groups were significantly different on the levels of stress, self-compassion and dysfunctional attitudes with TAU only group demonstrated a significantly higher level of self-compassion and lower level of stress and dysfunctional attitudes than TAU + IR group from the start (***Table 2***). No other measures showed significant differences at baseline. It could be due to the small sample size that randomization was not achieved on all baseline measures. This issue could potentially be rectified with a larger trial.

Retention. Retention was good for this study as all participants who completed an IR session stayed in the program and completed post measures. The two who left the treatment program did so prior to their IR session which could be considered as drop-out not related to the research element.

Implementation. No qualitative feedback was collected from participants as the feedback text box was provided at the end of the study when participants finished 7 days of homework. However, no participants completed 7 days of homework (only 1 participant completed 2 days of homework and others did not complete any homework) and therefore did

not see that question. Although participants were provided with the therapist email address at the end of session in case there is any feedback or concern, only one patient responded.

At this stage, we can only infer patients' experience from limited sources. Based on the student therapist's impression, participants generally found the imagery rescripting session itself was positive and helpful leading to decreased strength in negative beliefs rated on the imagery rescripting worksheet in session. Unsolicited positive feedback was provided by one participant saying that "although difficult, it has been a positive experiment and now when I think of the memory it feels much more hopeful." Additionally, one staff reflected that not many patients have mentioned their experience participating in the imagery rescripting research study during their time at the day program. And when she actively asked one patient about her experience, the patient reported the session being "very emotional but powerful" and that she was able to "refer back to the strategy later and use it as a coping strategy to tap into the compassionate wise imagery again". On the other hand, one other participant expressed to staff that her experience after the imagery rescripting was not positive. She said working on her past event was like "opening the Pandora's box", and she felt "unresolved" after the session. No significant distress or disengagement was detected during session by the student therapist and her worksheet indicated that although the event that she chose to rescript was confronting (i.e., mother's disclosure of suicidal intent), she was able to complete the session and come up with alternative more realistic beliefs, and her original beliefs were weakened slightly by the end of session.

Change over time

Table 3 shows the means and standard deviations of core beliefs strength pre and post imagery rescripting in the TAU+IR group, and the estimated marginal means and standard errors for other outcome measures at week 4 or discharge (whichever data is available) for all participants. Overall, the strength of negative core beliefs dropped on average by 2.91 points

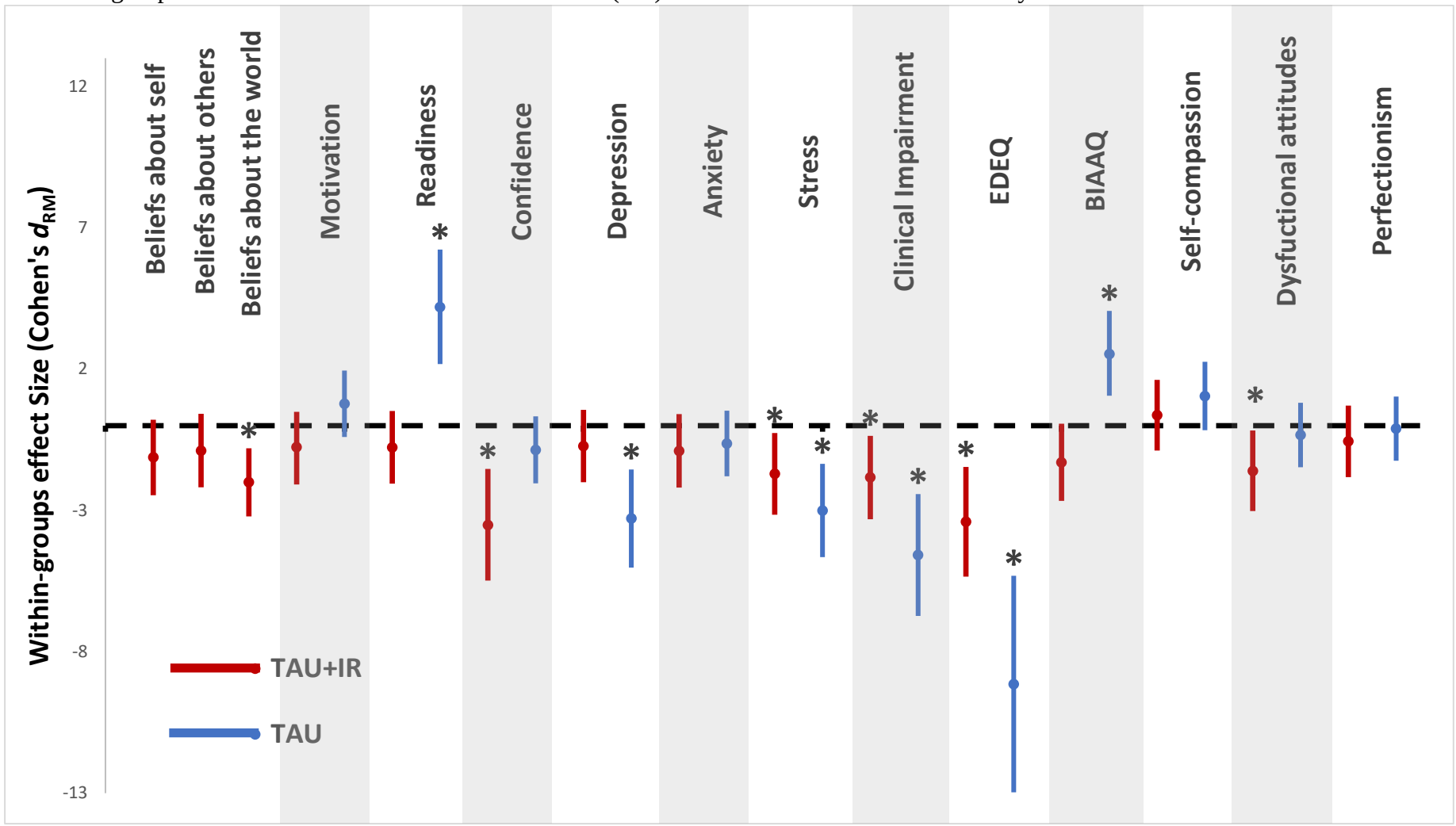
for beliefs about self, 1.5 points for beliefs about others, and 1.6 points for beliefs about the world. ***Figure*** 2 contains the within group effect sizes for each group with 95% CI. The TAU group showed five within-group effect sizes where the 95% CI did not cross zero (readiness, stress, body image acceptance in addition to clinical impairment and disordered eating, with all effect sizes larger than the commensurate effects sizes for the TAU+IR group). In contrast the TAU+IR group showed six such within group effect sizes. The first was the strength rating of negative beliefs about the world. The second was confidence which decreased more in the TAU+IR group compared to the TAU group. Stress, clinical impairment, and global eating psychopathology showed small decreases in the TAU+IR group compared to the TAU group. Dysfunctional attitudes showed a decrease that favoured the TAU+IR group.

Table 3. Linear Mixed Models estimated marginal means (M), standard errors (SE), main effects, interactions, effect sizes and 95% confidence interval for outcome variables by Time (2) and Condition (2).

	TAU + IR		**TAU**		***F* (df)**			
	BL M (SE)	**FU M (SE)**	**BL M (SE)**	**FU M (SE)**	**Time**	**Condition**	**Time x Condition**	**BG ES (95% CI)**
Core belief: self	8.00 (1.90)	5.08 (2.54)						
Core belief: others	7.33 (2.80)	5.83 (1.60)						
Core belief: world	8.60 (0.89)	7.00 (1.87)						
Motivation	74.00 (7.05)	68.50 (10.43)	84.20 (7.72)	92.60 (11.43)	.03 (9)	2.60 (9)	.79 (9)	1.02 (-0.24, 2.28)
Readiness	60.00 (8.89)	51.60 (9.28)	60.60 (9.73)	80.80 (10.17)	.53 (9)	1.92 (9)	3.07 (9)	**1.39 (0.07, 2.71)**
Confidence	67.17 (6.24)	47.33 (9.65)	82.20 (6.84)	78.00 (10.57)	4.67 (9)^{t}	4.57 (9)^{t}	1.98 (9)	**1.41 (0.08, 2.73)**
Depression	2.28 (0.27)	2.19 (0.35)	1.43 (0.29)	1.00 (0.38)	4.76 (9)^{t}	5.36 (9) *	1.93 (9)	**1.51 (0.17, 2.86)**
Anxiety	1.64 (0.22)	1.50 (0.27)	1.20 (0.24)	1.03 (0.30)	1.09 (9)	1.93 (9)	.01 (9)	0.76 (-0.47, 1.99)
Stress	2.41 (0.18)	2.26 (0.28)	1.77 (0.20)	1.23 (0.31)	7.00 (9) *	6.59 (9) *	2.38 (9)	**1.62 (0.25, 2.98)**
Clinical impairment	2.47 (0.25)	2.31 (0.28)	2.17 (0.27)	1.55 (0.30)	19.31 (9) **	1.97 (9)	6.99 (9) *	1.22 (-0.07, 2.51)
Global eating psychopathology	4.88 (0.46)	4.60 (0.54)	4.65 (0.50)	3.67 (0.59)	37.86 (9) ***	.63 (9)	11.67 (9) **	0.07 (-0.47, 1.99)
Body image acceptance	2.21 (0.32)	2.07 (0.44)	2.55 (0.35)	2.87 (0.48)	.41 (8.50)	1.07 (9.07)	2.55 (8.50)	0.81 (-0.42, 2.04)
Self-compassion	1.79 (0.16)	1.83 (0.22)	2.67 (0.18)	2.77 (0.23)	.42 (8)	11.71 (8.89) **	0.10 (8)	**1.95 (0.51, 3.38)**
Dysfunctional attitudes	3.28 (0.19)	3.07 (0.25)	2.40 (0.21)	2.36 (0.28)	.93 (9)	6.72 (9) *	0.38 (9)	1.24 (-0.06, 2.53)
Perfectionism	2.96 (0.21)	2.81 (0.08)	2.55 (0.23)	2.53 (0.09)	.35 (9)	3.30 (9)	0.23 (9)	**1.52 (0.17, 2.87)**

Note. BL = baseline; FU= week 4 follow up, WG ES = within group effect size, BG ES = between group effect size, CI = confidence interval. Bolded font indicated a significant effect size as 95% CI did not cross zero; * $p < .05$, ** $p < .01$, ***$p < .001$; ^{t} $.05 < p < .06$.

Figure 2. Within-groups effect size and 95% Confidence Intervals (CIs) for TAU+IR and TAU across study measures.



Discussion

This study investigated the feasibility of using face-to-face imagery rescripting as adjunct among day patient with an eating disorder by piloting a randomized controlled study. Findings suggest that the recruitment strategies require improvement, while retention was satisfactory. Ways to improve recruitment need to be examined especially with an intervention that focuses on past trauma and therefore may be perceived as too difficult by participants. In this study, although imagery rescripting did not worsen any symptoms, appeared to slow change for disordered eating and impairment and erode participants' confidence. We do note, however, that the imagery rescripting seemed to improve negative core beliefs about self, others, and the world within one session, and reduce dysfunctional attitudes within a month, a finding that accords with the target of imagery rescripting (Tatham, 2011). Hence, the suitability of imagery rescripting in eating disorders, especially Anorexia Nervosa, requires further investigation.

Although we cannot conclude from a pilot study that imagery rescripting is inappropriate for people receiving intensive treatment for eating disorders (Leon et al., 2011), it is a possibility to be considered. Given, however, that this does not accord with the findings in populations with disordered eating who are at risk of developing an eating disorder (Pennesi & Wade, 2018; Zhou et al., 2020), we will provide four other possible explanations in **CHAPTER 8** for these preliminary findings.

The results from this pilot study should be interpreted within the context of the following limitations. First, a small sample size which did not allow for successful randomization. More active recruitment strategies need to be considered for this population. Second, very little qualitative feedback from participants was obtained and more input from participants would have enhanced further iterations of the design. Third, although medical stability is a requirement for participants to enter the day program, being underweight could

potentially limit the processing of imagery rescripting although evidence is not conclusive currently (e.g., Connan et al., 2006 for instance, suggested that the change in size of the hippocampus, which is associated with memory and learning, is not associated with changes in cognitive functions among AN patients).

Nonetheless, this study marked the first attempt of piloting an RCT of imagery rescripting as an adjunct among eating disorder patients. As no other studies have done such work, the present findings have useful implications to guide future research of the usefulness of imagery rescripting as an adjunct in treating eating disorders. Consideration of timing, length of follow-up, format and content of the imagery are required. This work illustrates the value of pilot work (Leon et al., 2011) in raising specific considerations for future research in guiding the design of larger scale efficacy studies.

CHAPTER 7: WHAT MAKES BODY IMAGERY RESCRIPTING EFFECTIVE: MODERATOR ANALYSES (STUDY 4)

Abstract

Objective: This study investigated moderators that influence the effectiveness of imagery rescripting in decreasing disordered eating and increasing self-compassion among young females at risk of an eating disorder. **Method:** One hundred and twenty-one young females who received either online body imagery rescripting or psychoeducation between August 2018 and November 2020 were included in this study. Moderators investigated included baseline levels of global eating psychopathology, body image flexibility, dysfunctional attitudes, self-compassion, fear of self-compassion and confidence to change. Global eating psychopathology and self-compassion at one-week were the outcome variables. **Results**: Body imagery rescripting was more effective in reducing disordered eating if participants reported higher self-compassion or lower body image flexibility at baseline, whereas psychoeducation was more effective at reducing disordered eating among those who had higher body image flexibility at baseline. Regardless of the status of moderators, body image rescripting and not psychoeducation increased self-compassion. **Discussion**: We recommend assessing patients' body image flexibility at the start of ED treatment and use psychoeducation immediately to achieve early change in symptoms if score is higher than the cut-off (3.33); if not, imagery rescripting can be used to reduce eating symptoms and further boost self-compassion which may assist further progress in decreasing ED symptoms.

Keywords: Imagery rescripting, Self-compassion, Psychoeducation, Disordered eating, Body dissatisfaction.

Introduction

Based on results from **Chapter 6**, it is unclear whether imagery rescripting is suitable for eating disorders patients especially early in treatment. It appeared that introducing imagery rescripting too early might risk slowing recovery for some patients in terms of their disordered eating and body image flexibility, which is inconsistent with results from **Chapter 4** and **Chapter 5** among at-risk individuals. This may suggest that the severity of eating disorders symptoms may impact the effectiveness of the imagery rescripting approach.

In addition, the unique benefit of body imagery rescripting on self-compassion was not observed among eating disorder patients at one month when imagery rescripting was introduced within the first week of their treatments. This lack of impact of imagery rescripting on self-compassion bears similarity to what was found in **Chapter 5** that during COVID the impact of imagery rescripting on self-compassion was reduced compared to pre-COVID. It is possible that the success of imagery rescripting may be contingent upon factors in the environment (e.g., acute stressors such as starting a new treatment, lockdown).

Therefore, the aim of this study is to understand the conditions under which imagery rescripting can achieve its intended benefits on both disordered eating and self-compassion. We selected these variables as potential moderators: baseline levels of global eating psychopathology, body image flexibility, dysfunctional attitudes, self-compassion, fear of self-compassion and confidence to change. Global eating psychopathology and body image flexibility were selected to measure the impact of baseline eating disorder specific symptomology. Dysfunctional attitudes were used to reflect baseline level of negative core beliefs and was selected as a moderator because of its postulated relevance in imagery rescripting (Cooper et al., 2007; Dugué et al., 2019; Zhou et al., 2020). Self-compassion and fear of self-compassion at baseline may impact the effectiveness of intervention as previous studies found baseline low self-compassion and high fear of self-compassion predicted poor

ED treatment outcomes (Kelly et al., 2013b). Confidence to change reflects users' self-efficacy and it was selected as it has been shown to predict treatment outcome (e.g., Steele et al., 2010). We hypothesized that imagery rescripting may be more suitable to use when users have less severe baseline eating symptomology or rigid dysfunctional attitudes and higher self-compassion and confidence to change.

Method

Participants

All participants (N = 121) from two previous imagery rescripting studies (Zhou & Wade, 2021b; Zhou et al., 2020) who received the body imagery rescripting or psychoeducation intervention were included in the analyses for this study. They were female undergraduate university students, aged from 17 to 26 years, who were identified at risk of an eating disorder using a screening questionnaire (i.e., the Weight Concern Scale).

Design

Participants completed baseline questionnaires, received a negative mood induction (i.e., reliving as first person a previous negative body relevant event, such as being teased about weight and shape), and then underwent randomly allocated interventions. State measures of negative affect and state body image were collected at baseline, post-negative mood induction and post-interventions. Other measures of disordered eating, self-compassion, body image flexibility, self-compassion, fear of self-compassion, dysfunctional attitudes, and confidence to change eating were collected at baseline and again at one-week follow-up. Over the one-week follow-up, participants were asked to practise imagery rescripting; everyone completed at least one practice on top of the initial session (70% did at least five practices). The design is the same as that depicted in Figure 1 in Chapter 4 in this thesis.

Interventions

Body imagery rescripting. Participants are asked to re-imagine the negative event identified at negative mood induction by having their wiser, older, kinder, adult self at the scene who can intervene to provide support. Some ideas were provided such as one that suggest the adult self can offer compassion or provided updated information based on what they know now.

Psychoeducation. The Centre for Clinical Interventions handout entitled "eating disorder and neurobiology" was provided to participants, along with a short quiz to aid participants' understanding of the materials. Key take home theme of the handout was the plasticity of our brains, and that new neuropathways can be built especially when eating regularly, which is crucial for a recovery from an eating disorder.

Measures

The validated measures are listed in ***Table 1,*** and described in **Chapter 3**, and were selected to assess the following constructs: disordered eating, body image acceptance, self-compassion, fear of self-compassion, dysfunctional attitudes, confidence (i.e., "If you decided to work on improving the way you feel about your body, how confident are you that you would succeed?"), and state negative affect and body image.

Table 1. Internal consistency of one-week outcome measures.

Measures	Cronbach's α	
	Baseline	**One-week follow-up**
Eating Disorder Examination-Questionnaire (Fairburn & Beglin, 1994)	0.90	0.93
Body Image Acceptance & Action Questionnaire (Sandoz et al., 2013)	0.92	0.95
Self-Compassion Scale – Short Form (Raes et al., 2010)	0.81	0.82
Fear of Self-Compassion (FSC) Scale (Gilbert et al., 2011)	0.93	0.95
Dysfunctional Attitude Scales Short Form 1 (Beevers et al., 2007)	0.84	0.85

Statistical analyses

Baseline differences and predictors of dropout. Differences between conditions at baseline and baseline predictors of dropout were tested using logistic regression.

Missing data. Among 121 participants, 8 (6.6%) did not complete one-week measures. Logistic regression was conducted to identify baseline predictors of non-completion of one-week questionnaires. Expectation maximization was used to replace missing observations. Bonferroni's correction was applied for multiple comparisons.

Change in outcome over time. Linear Mixed Modelling (LMM) was used to compare the change in disordered eating and self-compassion at one-week follow-up among conditions. Fixed effects included time, condition and moderator level (high or low), and the three interaction terms, time x condition, time x moderator and time x condition x moderator. The moderators investigated when disordered eating was the outcome variable included baseline body image flexibility, self-compassion, fear of self-compassion, dysfunctional attitudes, and confidence. The moderators were the same when self-compassion was the outcome variable, with the addition of baseline disordered eating being and the removal of

self-compassion. Each moderator was made using a median split resulting in a dichotomous variable, low and high values of the moderator. Therefore, the LMM is a 2 (conditions: Body IR and Psychoed) x 2 (times: baseline and one-week) x 2 (low vs high moderator levels) structure.

Results

Baseline data

The mean age for this sample was 20.39 (*SD* = 2.05). Mean BMI was 25.45 (SD = 5.96). Based on reported BMI, 6 participants (5%) were in the underweight category, 61 participants (50.4 %) were in the normal weight category, 30 participants (24.8%) were in the overweight category, and 24 of them (19.8%) were in the obese category. Most participants reported having engaged in some forms of disordered eating during the 28 days prior to the study, including: binging (73%), driven exercise (67%), fasting (63%), vomiting (12%), and laxative misuse (6%). Overall, participants reported a mean global disordered eating score of 3.5 (*SD* = 1.04) for which is between 1 SD and 2 SDs above the mean global disordered eating scores for young adult females (Mond et al., 2006). Participants also reported a high level of weight concerns (*M* = 68.08, *SD* = 11.90).

Baseline differences between conditions and predictors of dropout

Logistic regression (***Table 2***) revealed no significant differences among baseline variables when comparing the two conditions. No baseline observations predicted non-completion of one-week questionnaires. Only post-randomisation state variables predicted non-completion (i.e., negative affect after mood induction and intervention; body image after mood induction). That is, higher negative affect after negative mood induction and after the interventions and worse state body image after intervention were associated with a higher rate of non-completion of questionnaires irrespective of conditions.

Table 2. Investigation baseline differences and baseline variables predicting dropout using logistic regression (Odd ratio and 95% CI).

Baseline variables	OR (95% CI) for differences between groups	OR (95% CI) for predictability of dropout
Data source (study 1 vs 2)	-	1.53 (0.73, 3.21)
Body mass index	1.00 (0.94, 1.06)	0.99 (0.87, 1.12)
Age	0.97 (0.82, 1.16)	0.93 (0.64, 1.35)
Ethnicity	0.89 (0.65, 1.22)	1.23 (0.72, 2.11)
Weight concerns	1.00 (0.97, 1.03)	0.98 (0.91, 1.04)
Global eating psychopathology	0.71 (0.50, 1.01)	1.07 (0.54, 2.14)
Body image acceptance	1.37 (1.00, 1.87)	0.56 (0.27, 1.14)
Dysfunctional attitudes	0.64 (0.33, 1.23)	1.47 (0.41, 5.20)
Self-compassion	1.97 (1.00, 3.88)	0.32 (0.07, 1.38)
Fear of self-compassion	0.68 (0.45, 1.02)	1.16 (0.52, 2.58)
Confidence	0.94 (0.79, 1.12)	0.98 (0.69, 1.39)
Baseline negative affect	0.70 (0.44, 1.11)	1.75 (0.77, 4.02)
Post mood induction negative affect	-	**2.24 (1.03, 4.86)**
Post intervention negative affect	-	**2.94 (1.20, 7.18)**
Baseline state body image	1.11 (0.83, 1.47)	0.66 (0.36, 1.24)
Post mood induction body image	-	**0.48 (0.25, 0.95)**
Post intervention body image	-	0.67 (0.38, 1.19)

Note. Bold font indicates when a 95% CI did not cross one, interpreted as a significant odds ratio

Moderators of disordered eating

When global eating psychopathology was the outcome variable, significant main effects of time were observed (***Table 3***), suggesting that regardless of condition and baseline moderator levels, there were significant reductions in participants' disordered eating at one-week. There were no significant interactions between time and condition, suggesting that the rates of change were not significantly different between conditions across time. Within-group effect sizes for repeated measures (RM) were 0.55 (95% CI = 0.18 - 0.91) for the Body IR condition, and 0.58 (95% CI = 0.21 – 0.94) for the Psychoed condition. Significant time x moderator interaction was observed for self-compassion. Specifically, post-hoc analyses suggest that those who reported higher baseline levels of self-compassion exhibited significant reduction in disordered eating at one-week, regardless of condition.

Significant time x condition x moderator interactions were observed for body image flexibility and self-compassion. Bonferroni-adjusted post-hoc analyses revealed that Body IR only produced significant decrease for participants who reported low body image flexibility at baseline (Cohen's d_{RM}= 0.79, 95% CI [0.31, 1.28]), and Psychoed produced significant decreases only for participants who reported high body image flexibility at the start (Cohen's d_{RM} = 1.13, 95% CI [0.62, 1.63]; see ***Figure 1***).

Furthermore, body IR only resulted in significant decreases in global disordered eating at one week if participants reported higher baseline level of self-compassion (Cohen's d_{RM} = 0.69, 95% CI [0.12, 1.26]). In contrast, Psychoed reduced participants' disordered eating regardless of baseline self-compassion level. This may indicate imagery rescripting may be more selective than psychoeducation in terms of creating ED specific benefits for its users.

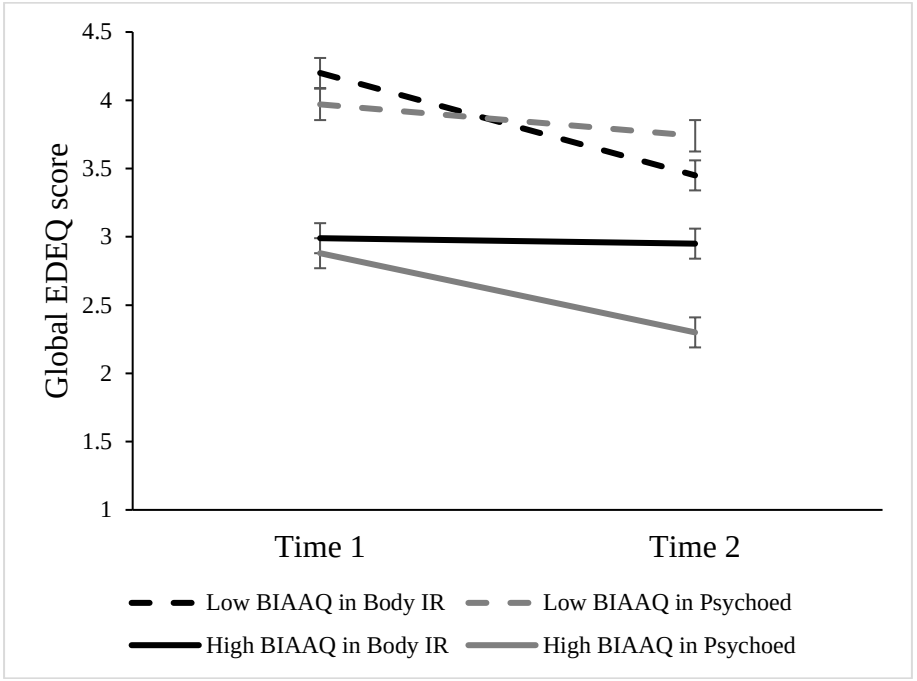
Table 3. Linear Mixed Models estimated marginal means (standard errors) for outcome variables (global EDEQ score and self-compassion) by Time (2) and Condition (2) for low and high level of moderators.

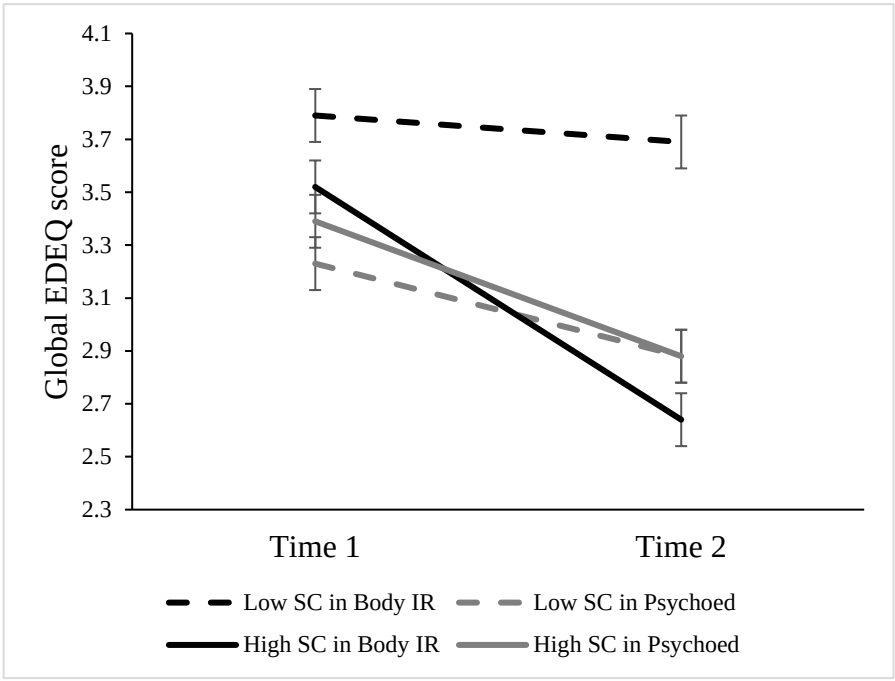
Moderators	Baseline				One-week				Main effects, F (df)			Interaction, F (df)	
	BIR		PE		BIR		PE						
	Low	High	Low	High	Low	High	Low	High	Time	Condition	Time x Condition	Time x Moderator	Time x Condition x Moderator
Changes in disordered eating as the outcome variable													
	4.20	2.99	3.97	2.87	3.45	2.95	3.74	2.30	26.22	1.16	<0.01	1.36	
BIAAQ	(0.15)	(0.17)	(0.18)	(0.14)	(0.18)	(0.21)	(0.21)	(0.17)	(110.40)***	(118.17)	(110.40)	(110.40)	11.41 (110.40)**
	3.79	3.52	3.23	3.93	3.69	2.64	2.88	2.88	36.32	3.07	0.13	9.39	
SCS	(0.17)	(0.21)	(0.19)	(0.19)	(0.19)	(0.22)	(0.21)	(0.20)	(110.64)***	(117.26)	(110.64)	(110.64)**	4.15 (110.64)*
	3.55	3.80	3.11	3.57	3.07	3.38	2.59	3.23	29.09	3.19	0.01	0.58	
FCS	(0.19)	(0.18)	(0.18)	(0.20)	(0.22)	(0.20)	(0.20)	(0.22)	(110.59)***	(117.71)	(110.59)	(110.59)	0.15 (110.59)
	3.30	3.96	3.20	3.43	3.01	3.42	2.70	3.06	27.42	3.19	0.01	0.15	
DAS	(0.20)	(0.17)	(0.18)	(0.18)	(0.24)	(0.19)	(0.21)	(0.21)	(110.24)***	(117.65)	(110.24)	(110.24)	1.31 (110.24)
	3.91	3.38	3.51	2.96	3.49	2.91	3.09	2.49	28.54	5.05	<0.01	0.09	
CONF	(0.17)	(0.20)	(0.16)	(0.22)	(0.20)	(0.22)	(0.18)	(0.24)	(110.28)***	(116.97)*	(110.28)	(110.28)	<0.01 (110.28)
Changes in self-compassion as the outcome variable													
	2.49	2.37	2.62	2.63	2.58	2.74	2.57	2.73	10.07	0.89	6.00	6.89	
EDEQ	(0.11)	(0.09)	(0.09)	(0.11)	(0.12)	(0.10)	(0.10)	(0.12)	(110.38)**	(116.99)	(110.38)*	(110.38)**	0.49 (110.38)
	2.31	2.58	2.40	2.77	2.62	2.75	2.51	2.72	10.73	0.15	6.50	3.71	
BIAAQ	(0.09)	(0.10)	(0.11)	(0.08)	(0.10)	(0.12)	(0.12)	(0.10)	(110.09)***	(116.97)	(110.09)*	(110.09)	0.01 (110.09)
	2.68	2.20	2.74	2.48	2.95	2.44	2.71	2.55	11.09	0.28	8.25	0.22	
FCS	(0.10)	(0.10)	(0.10)	(0.10)	(0.11)	(0.10)	(0.10)	(0.11)	(109.96)***	(115.78)	(109.95) **	(109.95)	0.67 (109.95)
	2.61	2.29	2.80	2.44	2.89	2.52	2.79	2.48	10.71	0.32	8.84	<0.01	
DAS	(0.10)	(0.29)	(0.10)	(0.10)	(0.12)	(0.10)	(0.10)	(0.10)	(110.37)***	(116.62)	(110.37)**	(110.37)	0.28 (110.37)

CONF	2.33 (0.10)	2.55 (0.11)	2.52 (0.09)	2.82 (0.12)	2.44 (0.10)	2.97 (0.11)	2.50 (0.09)	0.88 (0.12)	12.55 (110.62)***	1.33 (116.46)	8.88 (110.62) **	5.68 (110.62)*	2.16 (110.62)

Notes. *p<.05, ** p< 0.01, ***p < .001

Figure 1. Global EDEQ scores by condition (2: Body IR, Psychoed), time (2: baseline, one-week) and baseline BIAAQ/SC level (2: low; high).



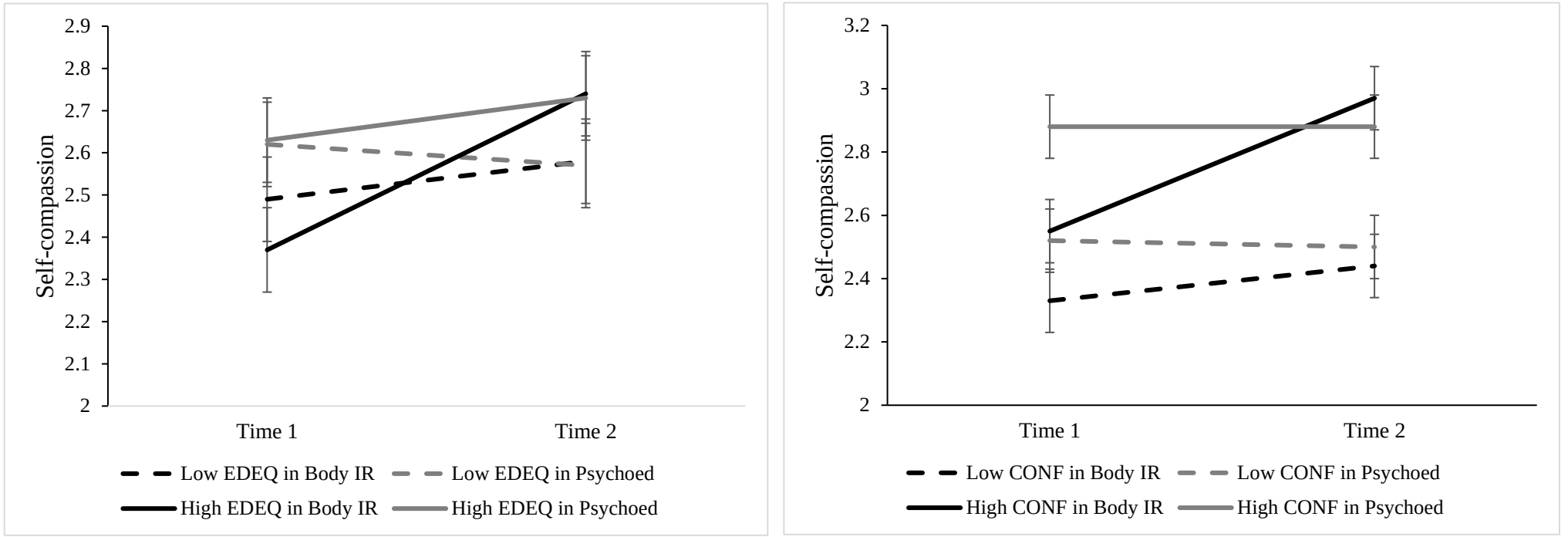


Moderators of self-compassion

Linear mixed model analyses revealed significant main effects of time (***Table 3***). Significant time x condition interactions were observed for all models indicating that it was the Body IR condition, not Psychoed, that increased participants' self-compassion at one-week. Overall, within-group effect sizes are 0.62 (95% CI = 0.25 - 0.98) for the Body IR condition overall, and 0.04 (95% CI = -0.31 – 0.40) for the Psychoed condition.

Significant time x moderator interactions were observed for global eating psychopathology and confidence. Post-hoc analyses suggested that, regardless of condition, increases in self-compassion were only significant among those who reported higher baseline levels of disordered eating and higher confidence. No time x condition x moderator interactions were found (see ***Figure 2***).

Figure 2. Self-compassion scores by condition (2: Body IR, Psychoed), time (2: baseline, one-week) and baseline global eating psychopathology (EDEQ) and confidence (CONF) level (2: low, high).



Discussion

This study investigated specific moderators that influence the effectiveness of body imagery rescripting in reducing disordered eating and increasing self-compassion among young females who are at risk of developing an eating disorder. Body imagery rescripting was more effective in reducing disordered eating if participants reported higher self-compassion or lower body image flexibility at baseline. On the other hand, psychoeducation was more effective at reducing disordered eating among those who had higher body image flexibility at the start. Regardless of the status of moderators, body image rescripting and not Psychoed increased self-compassion.

A limitation of the current research includes use of a small sample with disordered eating who were not necessarily seeking help for an ED. In this way the research can be seen to be relevant to an indicated intervention context. Future studies need to investigate the use of imagery rescripting in a clinical setting with people seeking help for disordered eating or with an ED. It would be helpful to understand whether imagery rescripting can still offer its benefits to this group, and how it fits into the current practice of ED treatments. Although based on the current moderator analyses, a high level of symptoms will not impact the effect of imagery rescripting, which may indicate it can be appropriate to use at the start of treatment if matched to those with higher levels of self-compassion, it is yet a hypothesis to be tested in a clinical group. Additionally, as the power analysis in Chapter 4 (p. 59) suggested, detecting a between group effect size difference of 0.60 for the global EDE among group groups requires around 34.5 in each group, hence this study is likely to be under powered and the use of a median split to create moderator may further limit power, hence results should be interpreted with caution.

A further limitation of the research is that the interventions were not matched for time, with most participants practising imagery rescripting after the first session. Future

research should compare interventions matched for time. Our results should also be interpreted in the context of imagery rescripting being conducted online, rather than the usual face-to-face format. This may have diluted the impact of imagery rescripting. It does, however, present an efficient intervention for an indicated prevention approach. Typical use of imagery rescripting would also involve the use of multiple sessions. A meta-analysis of imagery rescripting across psychological disorders suggested that the number of sessions moderated the within-group effect sizes of symptom change (Morina et al., 2017), with more sessions producing larger change. Further research is required to the impact of multiple imagery rescripting sessions over time on patients' outcomes.

CHAPTER 8: SUMMARY, SYNTHESIS, AND INTEGRATION OF OVERALL FINDINGS

Overview of the aims of this thesis

This thesis aimed to investigate the efficacy of using imagery rescripting (IR) as a treatment adjunct for disordered eating. We first investigated whether IR is more powerful with young females at risk of disordered eating if focused on past events related to the body or more general traumatic events. Then we investigated the impact of combining IR with psycho-education in young females at risk of disordered eating. Finally, we investigated whether use of IR as an adjunct to treatment as usual (day hospital settings) significantly improves outcomes, and under what conditions IR can be helpful or effective for young females at risk of disordered eating.

Contribution of this thesis to the literature: Summary of key findings

Findings from the current research

General imagery rescripting. We found from our research (**CHAPTER 4**) that general types of negative imagery are prevalent among people who experience disordered eating. This is consistent with the research of Dugué et al. (2016) who found that other than disorder-specific imagery, imagery related to social rejection has been found to be associated with greater desire to eat among individuals with binge eating disorders. Such imagery was also experienced more vividly among people with binge eating disorder (Dugué et al., 2016) and bulimia nervosa (Somerville et al., 2007) than nondieting control participants. Rescripting such general negative imagery was shown in our studies to decrease dysfunctional attitudes (**CHAPTER 4)** and associated core beliefs (**CHAPTER 6**), similar to the findings of a meta-analysis (Morina et al., 2017) that revealed a large effect size decrease for core beliefs (g = 1.81) using imagery rescripting across four studies, three of which were randomised controlled trials (Cooper et al., 2007; Lee & Kwon, 2013; Reimer & Moscovitch,

2015; Wild et al., 2007). More recent research has also shown a decrease in core beliefs in response to IR. For instance, in social anxiety disorder (SAD), Romano et al. (2020) found that compared to imaginal exposure and supportive counselling, participants who received a single session of IR were more likely to update their negative core beliefs that were associated with negative memories to something more realistic or positive when they were asked to reflect on what they learned during the intervention and whether they would like to alter their original beliefs. Similarly, Norton et al. (2021) found that, also among people with SAD, participants reported significant reduction in the strength of their negative core beliefs between baseline and after the second IR session.

Body imagery rescripting. Anecdotally, among those who were instructed to recall a general experience that was not body-related in one of our research studies, one participant said that "it was almost impossible to think of a negative event that is not associated with the body". Such overvalued importance of body image is often observed in individuals with body image concerns or eating disorders. Rescripting these images of body experience was shown to be the preferred approach for increasing self-compassion in young females at risk of disordered eating across our studies (**CHAPTER 4, 5 and 7**), although its impact was attenuated during COVID (**CHAPTER 5**). Our moderator analyses suggested that, in the presence of higher self-compassion or lower body image flexibility, it is also a useful tool for decreasing disordered eating (**CHAPTER 7**).

Psychoeducation. Findings from this research showed that a "malleable biology" psychoeducation approach alone can help reduce disordered eating and increase body image flexibility (**CHAPTER 4**). Indeed, it may be the case that psychoeducation which emphasizes the role of genetics and the brain in EDs, and the malleability of the brain, might be particularly relevant to at-risk university populations, where thinking is valued. This is consistent with research that suggests that a focus on neurobiologically informed treatment

for anorexia nervosa is showing some promise (Wierenga et al., 2018). The limitation of psychoeducation, however, is that it did not have a significant impact on any non-disorder-specific variables. In some cases, receiving psychoeducation resulted in lower self-compassion than body IR (**CHAPTER 4**), and higher fear of self-compassion when combined with BIR (**CHAPTER 5**). This may indicate such information can be uncomfortable or even confronting for some people, as reflected by one participant who wrote in the study one feedback: “the (Psychoed) handout, although being rather confronting, has let me gain knowledge and understanding that eating disorders aren’t what many perceive them to be.” However, in other cases, information alone seemed to increase self-compassion such as during COVID (**CHAPTER 5**). Moderator analyses further revealed that psychoed can decrease disordered eating only in the presence of high levels of body image flexibility (**CHAPTER 7**) but also across varying levels of self-compassion.

Combination approach. Our findings suggest that combining psychoed and imagery rescripting does not necessarily produce stronger effects compared to when they were used on their own (**CHAPTER 5**). For instance, although combination did increase participants’ self-compassion pre-COVID compared to control, its magnitude of change was smaller than when imagery rescripting was used on its own. Furthermore, combination resulted in higher fear of self-compassion scores compared to psychoeducation alone at pre-COVID, which may indicate more barriers to practise self-compassion may occur when risk-informed information is paired immediately with rescripting negative memories. However, combination did increase participants’ body image acceptance during COVID compared to control while other interventions alone did not. It could be in greater times of adversity, a “double strength” intervention is required, but that in ordinary times it is not necessary or helpful. More evidence is needed to test in what settings combination conditions can be helpful.

In the context of the broader literature

At the start of this thesis (i.e., the year of 2018), there were three studies on the topic of imagery rescripting and disordered eating (Cooper et al., 2007; Ohanian, 2002; Pennesi & Wade, 2018), two on body dysmorphic disorder (Ritter & Stangier, 2016; Willson et al., 2016), and a few other theoretical discussions on using imagery rescripting in eating disorders (Cooper, 2011; Tatham, 2011). Over the subsequent three-year period, there are an additional three studies, including our publications, evaluating imagery rescripting with disordered eating (Dugué et al., 2019; Zhou & Wade, 2021a; Zhou et al., 2020). Taken together, the literature seems to suggest: (1) general imagery rescripting can reduce core beliefs associated with disordered eating behaviours (Cooper et al., 2007; Dugué et al., 2019; Ohanian, 2002; Ritter & Stangier, 2016; Zhou & Wade, 2021a); (2) body imagery rescripting can increase self-compassion and decrease disordered eating among at-risk samples (Pennesi & Wade, 2018; Zhou et al., 2020); (3) Overall, almost all studies showed rapid effects usually within the first week after a single-session intervention (Cooper et al., 2007; Dugué et al., 2019; Ohanian, 2002; Pennesi & Wade, 2018; Ritter & Stangier, 2016; Willson et al., 2016; Zhou et al., 2020). Across these studies, it's clear that there is a potential utility for using imagery rescripting as an adjunct treatment in eating disorders. More research is required to inform matching the type of imagery rescripting to the corresponding treatment goals (**CHAPTER 4**), matching imagery rescripting to the right people that will likely benefit from it (**CHAPTER 7**), and find the right timing for this intervention (**CHAPTER 6**).

Clinical considerations of imagery rescripting

Why only BIR increases self-compassion but not GIR? It is of interest that all increases in self-compassion occur exclusively within the context of using body-focused imagery rescripting among people experiencing disordered eating (**CHAPTER 4, CHAPTER 7**). This finding may suggest body-related imagery is the most pertinent imagery

to rescript to target self-compassion for people with an eating disorder. Moderator analyses further revealed that body imagery rescripting may better achieve this effect if the person is experiencing more severe disordered eating symptomology and has a higher confidence to change (or higher self-efficacy; **CHAPTER 7**).

Both types of imagery content (general versus body-specific) appear relevant to disordered eating. General content can include mental imagery of social rejection, bullying and teasing (Dugué et al., 2016; Hinrichsen et al., 2007; Somerville et al., 2007), consistent with the transdiagnostic model which suggests interpersonal difficulties are a maintaining factor for disordered eating (Fairburn et al., 2013a). Others have previously identified the relevance of body-related imagery in maintaining disordered eating (Blackburn et al., 2012; Hijne et al., 2020; Kadriu et al., 2019).

However, in terms of the types of imagery content in relation to *self-compassion,* this is the first research to date to suggest perhaps for these individuals, rescripting body-related negative memories among other memories is most effective in terms of overcoming barriers to practise self-compassion. This is perhaps due to the central role of body in determining self-worth or in other words the overvaluation of body in this population (Wang et al., 2018).

Explanations for the lack of impact of face-to-face IR in a clinical setting. Introducing imagery rescripting within the first week of treatment was shown to slow recovery and decrease confidence for patients who were receiving a partial hospital treatment for an eating disorder (**CHAPTER 6**). Confidence or self-efficacy has been shown to predict symptoms severity at the end of treatment (Keshen et al., 2017; Steele et al., 2011). As well, early symptom change is most predictive of treatment outcomes (Graves et al., 2017; Turner et al., 2015; Vall & Wade, 2015). Hence, these findings are especially concerning when considering imagery rescripting as a treatment adjunct.

Four possible explanations can be considered for the lack of effect of imagery rescripting within the first week of treatment in this pilot study. First, perhaps the timing was not ideal for this population. Rescripting potentially confronting imagery early on in treatment could be "stirring up the water" which could potentially slow down recovery. At the beginning of treatment patients had to undergo many new changes and challenges in their lives associated with entering an intensive treatment. Tackling negative memories of past events in this context might render imagery rescripting less effective. Typically core beliefs would not be tackled until later (e.g., around session 8) in cognitive behavior therapy (Ohanian, 2002; Waller et al., 2019) and future studies should conduct a randomized controlled trial (RCT) when IR is introduced later in treatment when patients have built up some skills and resilience to manage distress.

Second, perhaps the timing was appropriate, but the effect of IR takes longer to demonstrate in a clinical setting where patients present higher symptomology compared to at-risk samples. As we only had data showing change in approximately one month in the outpatient study (**CHAPTER 6**), we did not know the trajectory of patients' progress beyond that time frame. It is possible that TAU+IR group could catch up with TAU with some advantage shown for dysfunctional beliefs. Longer-term follow-up would be required to investigate this trajectory. Additionally, although our previous study suggested that the number of homework occasions completed did not predict outcome in a high-risk population (Zhou et al., 2020), the average number of homework occasions completed in that previous study (M = 5.46 – 5.71 days) was much higher than the current study (M = 0.33 days), which may suggest some repetition of rescripting is required for more desirable outcomes. Future design could investigate difference between implementing homework versus no homework on treatment outcomes with imagery rescripting, especially among eating disorder day patients who might already have a high activity load (e.g., participation in different groups).

Third, we do not know if a face-to-face approach is indeed a superior approach for imagery rescripting as no research directly compares face-to-face with online approaches. We note that the two previous RCTs that showed promise in an at-risk population (Pennesi & Wade, 2018; Zhou et al., 2020) were conducted online. It is likely that with therapists' prompts, patients can elicit more detailed imagery which are often associated with stronger emotional impact (Holmes & Mathews, 2010). This could, however act as a double-edged sword as vividness of a remembered trauma may increase distress. On the other hand, an online approach could provide the privacy and space where a person can write about their experience at their own pace without having to share with anyone which could potentially decrease the distress or anxiety associated with the rescripting process.

Fourth, the content of imagery should be tailored to the patient's history and progress. In this study patients could choose what type of imagery they wished to work with, either body-related or general, and 4 out of 6 participants chose to rescript a past event related to body or eating, and 2 rescripted a general life event. New research suggested that rescripting body-related imagery can improve self-compassion whereas rescripting general imagery that is not related to disordered eating can improve dysfunctional attitudes among an at-risk population (Zhou et al., 2020). Perhaps the therapist and patients should be more mindful in the selection of imagery at the beginning of treatment to prevent rescripting an overly distressing imagery initially. Additionally, once patients have built a foundation of resilience, then perhaps more confronting, past general life events can then be explored and rescripted. Emerging research has also shed light on other variants of imagery rescripting (Siegesleitner et al., 2020) related to the content of rescripting as active (i.e., imagining themselves intervening) versus passive (i.e., imagine a helper not themselves intervening). For instance, perhaps eating disorders patients should be encouraged to utilize the active form of IR as it has been shown to increase positive affect which could help contain any distress

associated with the rescripting process (Siegesleitner et al., 2020). It is also possible that one session of imagery rescripting might be more suited to rescript a particular theme of core beliefs (e.g., failure to achieve) than others that are central to identity (e.g., defectiveness/shame, insufficient control), and may be associated with more severe symptoms or more occasions of unsuccessful treatment (Waller et al., 2000), requiring repeated sessions. Future research needs to identify if there is a specific theme of core beliefs that IR is most effective in changing within one session, and if other themes require more sessions for IR to be effective.

Is homework required in IR? Homework completion was significantly higher in university samples (**CHAPTER 4 and 5**) when participants were reimbursed by course credits or cash than in clinical samples who showed extremely low homework completion rate (i.e., only one person did two days of homework, **CHAPTER 6**). However, none of our findings suggest that the amount of home practice was correlated with outcomes. Other research has discussed the usefulness of additional sessions or home practices in clinical settings. For instance, Brewin et al. (2009) used multiple sessions of IR to treat major depressive disorder, and Brewin et al. found a nonsignificant trend suggesting that those who have more treatment sessions showed greater improvement on depression symptoms. The main rationale for additional sessions according to these researchers was to address new intrusive memories that emerge from the originally rescripted imagery. Maier et al. (2020), Schaitz et al. (2020), and Smucker et al., (1995) asked patients to listen to the audiotape of the description of the rescripted imagery to rehearse the new imagery as homework. Homework can also take the form of recalling the rescripted version and rehearsing updated beliefs as in Romano et al. (2020). None of these studies reported the link between the number of homework completed and treatment outcomes despite the commonality to include homework in the IR protocol. However, adherence to imagery-based homework associated

with prolonged exposure commonly used in PTSD treatment– imaginal exposure - was shown to be associated with greater PTSD symptoms reduction and predictive of remission (Cooper et al., 2017). Further research is required on the role of repeated practice in improving outcomes in this population, a question that also needs to be addressed in other populations (Morina et al., 2017).

The accessibility of online imagery rescripting in the context of a pandemic. The research indicated that the COVID pandemic did impact the baseline symptomology of our participants and the effect of our interventions (**CHAPTER 5**). For instance, participants who entered the study during COVID had significantly higher weight concerns, eating disorder psychopathology, negative affect and poorer body image. As eating disorder services are hard to access during COVID (Richardson et al., 2020), online IR could be a viable alternative as it can be delivered in the duration of 15 minutes and patients could repeat the process as many times as they wish (**CHAPTER 4 and 5**). Some of the common practical concerns often associated with IR telehealth delivery such as thin walls in small houses, family members or housemates being at home during therapy session (Paulik et al., 2021) may potentially be overcome by the online version of IR. Future research is needed to directly compare the efficacy of IR delivered in different formats such as online self-guided, or face-to-face/telehealth therapist guided approaches.

In light of our research finding that IR when enhanced by psychoeducation could increase body image acceptance during COVID, for those who identified risk or who are seeking treatment for an eating disorder, we recommend providing such “malleable biology” psychoeducation. In terms of its usefulness as an addition to imagery rescripting, teaching patients the malleability of the brain may encourage rehearsing alternative images or thoughts that are more balanced or helpful which may prepare patients for imagery rescripting. Future studies can clarify this hypothesis by investigating the effect of the combination intervention

when presented in a different sequence than this current study (i.e., psychoeducation first followed by imagery rescripting).

Precision medicine approach. We found that Body IR was effective in decreasing disordered eating among people who exhibit low body image flexibility, and those who have high baseline self-compassion (**CHAPTER 7**). On the other hand, Psychoed was effective in decreasing disordered eating among people who exhibits high body image flexibility, regardless of baseline self-compassion level (**CHAPTER 7**). Aligned with the precision medicine approach which aims to provide individualized effective treatments for specific populations of patients (Breithaupt et al., 2018; Fernandes et al., 2017), we recommend using the BIAAQ as a screening tool before making a decision to provide Psychoed or Body IR early in eating disorder treatment. Specifically, if patients displayed a baseline score of body image flexibility higher than the cut-off used in this study (i.e., 3.33 on BIAAQ), we recommend Psychoed as an adjunct for eating disorder treatments to achieve reduction in disordered eating. This accords well with the preferred approach of eating disorder therapies as early symptom change is the most robust predictor of treatment outcomes (Vall & Wade, 2015). However, if patients' body image flexibility is below cut-off, then using body imagery rescripting first may reduce the disordered eating among those with low body image flexibility. However, the current findings do not inform the direction of cause and effect between levels of disordered eating and efficacy of IR, as we found on one hand that Body IR is more likely to increase self-compassion among people who have high level of disordered eating, and Body IR is more likely to decrease disordered eating among those who have high self-compassion. Hence, it is reasonable to form the hypothesis that using body imagery rescripting may lead to an increase in self-compassion which may have a flow-on effect for disordered eating over time. However, more research is needed to examine such hypothesis. Indeed, Kelly et al. (2014) suggested that patients who had greater increase in self-

compassion early on in treatment displayed greater decrease in their levels of shame, which when targeted early led to a faster reduction in eating disorder symptoms.

Limitation and future directions

First, it is possible that we compared interventions (online/face-to-face IR, body IR, or general IR) that have different mechanisms of action. The current research did not address the issue of through which mechanisms both types of IR might work. Despite the use of IR in various mental disorders, few studies had investigated the mechanisms of this approach. Mediation analyses may provide clues to potential mechanisms. Pennesi and Wade (2018) found that increase in body image flexibility and self-compassion mediated the relationship between imagery rescripting and reduction in disordered eating and the two mediators explained 59% of the effect. In other mental conditions such as nightmare, Kunze et al. (2019) found that increased mastery of the nightmare content (i.e., feeling in control of the nightmare content) mediated the relationship between IR and treatment outcome measured by reduced nightmare distress and frequency. Mastery explained 50% of the variance. They also found that increased ability to tolerate emotions elicited by nightmares explained 19% of the effect on reduced nightmare distress (but not frequency). Further, Strohm and colleagues (2019) also found that IR increases feeling of mastery in response to retrieving a negative autobiographical memory in one week in addition to reducing negative emotional responses (reduction in sadness and distress). However, such increased mastery produced by IR was not replicated in Strohm et al. (2021). There are few consistent mediators of the efficacy IR that have been researched and replicated so far.

One of the common hypotheses proposed by researchers about the underlying mechanisms of IR is the unconditioned stimulus (US) revaluation or devaluation hypothesis stemming from the classical conditioning paradigm (Arntz, 2012; Arntz et al., 2007; Dibbets, et al., 2012; Hagenaars & Arntz, 2012). That is, IR may exert its effect by changing the

mental representation of the memory. For instance, Dibbets et al. (2012) hypothesized that if the US revaluation was in fact the underlying mechanism of IR, IR would work better than mere extinction (when conditioned stimuli, CS, is paired without US hence reduce conditioned response, CR) as extinction does not target the meaning of US. Hence IR should lead to less renewed responding compared to when US was not revaluated during extinction. Dibbets et al. found that IR decreased the negative valance associated with the US (support for IR changed meaning of US) and led to less CR, which supports the US devaluation hypothesis.

Other mechanisms discussed in the literature involved reducing meta-emotional problems (e.g., viewing one's suffering as acceptable and deserving of care; Mancini & Mancini, 2018), emotional processing (Arntz & Weertman, 1999; Edwards, 2007; Smucker et al., 1995), and emotion regulation (Jacob et al., 2011). It is possible that the approaches to imagery rescripting used in this thesis comprise some or all combinations of these mechanisms. For informed comparisons in future research, studies should posit and test mediational pathways.

Second, except for the work with the clinical population (**CHAPTER 6**), the rescripting protocol used in this thesis asked participants to type on a computer the content of their imagery. One could argue that writing may potentially affect the quality of the visualization (e.g., render imagery less vivid) and hence impact the efficacy of imagery rescripting. This is suggested by the work of Emily Holmes and colleagues, that imagery elicits stronger emotions and more effective in changing automatic interpretations than verbal processing (Holmes & Mathews, 2010; Holmes et al., 2006). However, Rijkeboer et al. conducted a study where participants are asked to rescript memories of a "trauma film" either via imagery or writing (2020). They showed that both rescripting conditions led to fewer intrusions of the film compared to control and there were no significant differences in terms

of distress caused by these intrusions in one-week post intervention between the two rescripting methods. They hence suggested that writing might be a viable alternative to pure imagery visualization. It is currently not clear whether writing rescripted imagery facilitates or maintains IR effect or hinders it. Future studies can include imagery property ratings (such as vividness) and clarify whether the efficacy of imagery rescripting may be impacted by an additional writing component.

Third, the conclusions we can make about IR as an early intervention program (**CHAPTER 4**) is impacted by a possible mixed population (i.e., some participants might have met diagnostic criteria for an eating disorder diagnosis). It is possible all interventions (Body IR, general IR and psychoed) might work differently in diagnostic samples. However, the external validity of the study is strengthened as we mimicked the real-world conditions where online interventions providers do not tend to screen for diagnoses (Wilksch et al., 2017). Future research should examine demographic moderators of intervention outcome, such as gender, age, diagnostic status, ethnicity and socio-economic status.

Fourth, although our findings support the use of an online approach to IR, more research is needed to investigate whether this approach could be as effective, or even superior, to a face-to-face approach. It is possible that the lack of therapeutic guidance may limit the richness and vividness of the imagery, and hence its emotional impact, and use of words dilute the impact of the imagery (Holmes & Mathews, 2010).

Fifth, the optimal timepoint in an intervention for introducing IR as an adjunct intervention that is matched to patient characteristics needs to be examined. Baseline moderators of change need to be examined which could suggest whether one is ready for negative or traumatic experience to be processed and rescripted to aid the identification of correct timepoint. Such indicators may include a lower stress environment (e.g., not at start of intensive treatment), or lower levels of disordered eating (i.e., EDE-Q global scores between

1 *SD* to 2 *SD*s above the norm but not beyond 2 *SD*s). It may be that imagery rescripting is
2 more suited as an early prevention approach rather than for people receiving treatment for
3 eating disorders, a question that future studies can clarify. This suggestion is consistent with
4 previous evidence suggesting imagery rescripting was able to impact the way aversive
5 memory was consolidated in the brain resulting in a less intrusive memory (Hagenaars &
6 Arntz, 2012), which suggests imagery rescripting may be better used early in the
7 development of an eating disorder. Investigating how to best include a debrief in the existing
8 online approach would also be of value, in terms of whether the online format could deliver a
9 greater impact, and to what groups of participants.

10 **Conclusion**

11 This thesis investigated the utility of imagery rescripting in reducing disordered
12 eating and increasing self-compassion among young females at risk of disordered eating.
13 Research on imagery rescripting among people with eating disorders is in its nascent stage.
14 This thesis adds to the existing literature by providing data to support the efficacy of different
15 approaches to imagery rescripting and provided specific precision medicine
16 recommendations when using imagery rescripting. More RCTs are needed to examine the
17 efficacy of imagery rescripting in a larger clinical context with people with different eating
18 disorders. An effective treatment adjunct such as imagery rescripting can potentially improve
19 the current state of eating disorders treatment (Linardon & Wade, 2018) and reduce burden
20 associated with the disorders (Santomauro et al., 2021).

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CHAPTER 9: PUBLICATIONS AND APPENDICES

APPENDIX A: PUBLISHED STUDY 1

APPENDIX B: PUBLISHED STUDY 2

APPENDIX C: PUBLISHED STUDY 3

APPENDIX D: IMAGERY RESCRIPTING INSTRUCTIONS TO PARTICIPANTS (ONLINE STUDIES)

Body IR

Please read the following carefully.

Please think about a **recent** event of an **unpleasant body experience where you might have felt ashamed or embarrassed of your body or how your body looks**.

Some examples are:
being teased by your peers about how you look
receiving negative/critical comments with respect to appearance
feeling uncomfortable/insecure about your body when trying on clothes in a change-room, looking yourself in the mirror, getting ready with friends to go to a party, walking past a group of people who were looking at you, out in public.

Now take a moment to close your eyes and imagine (or visualize) this recent event as it is happening right now. Notice your thoughts and feelings that arise during this exercise.

Please only continue once you have this event in mind.

[Page Break]

1

Now reflect on those thoughts and feelings you just had and try to identify the **earliest** event you could remember associated with them. It could be something that happened to you when you were a child, or a teenager. Again, take a moment to close your eyes and imagine this earliest event as it is happening right now. Notice your thoughts and feelings that arise.

Some examples are:

being teased by your peers about how you look

receiving negative/critical comments from your parents with respect to appearance

feeling uncomfortable/insecure about your body when getting ready to a party

Please only continue once you have this event in mind.

[Page Break]

1

When you're ready, please write about this **earliest** event that you just recalled in the next 5 minutes.

Reminder: Write about the **earliest** memory of an **unpleasant body experience where you might have felt ashamed or embarrassed of your body or how your body looks**.

Please write in **first person** and describe the event as it is happening **right now**. You should include as much details as you can such as where you are, what you are doing, who you are with, what you can see, how you are feeling (emotions), and what is going through your mind (thoughts).

[Typing Space]

Remember, write in first person, as it is happening right now.

If you think you have finished before the time is up, go back and review what you have already written and rephrase or rewrite as necessary. Please try to keep going. After 5 minutes is up, the next button will appear and you may continue.

[Page Break]

2

Now think about the same memory you wrote earlier. This time, when you close your eyes and imagine (or visualize) this event, **imagine it from an observer's perspective. Imagine that your adult self is in the room observing what's happening to your younger self right now, watching the events unfold.**

Now take a moment to close your eyes and imagine this event as if it were happening to your younger self right now.

Please only continue when you have completed the visualization.

[Page Break]

2

For the next 5 minutes, please write about what you see from an **observer's perspective as if it were happening to your younger self right now.**

Please write in **third person** (e.g., if your name is Sarah, write "I see Sarah in the change room, she is trying on a pair of blue jeans…"), and include as much details as you can such as

where Sarah is, what Sarah is doing, who Sarah is with, how Sarah might be feeling (emotions), and what Sarah might be telling herself (thoughts).

Please describe what you see from **an observer's perspective** as if it were happening to your younger self right now.

[Typing Space]

Remember to write in third person, observing the event as it is happening **right now.**

When you're finished please take a minute to think about what needs to happen in the memory in order for your younger self to feel better or if there is anything your adult self would like to do to help the younger self in that situation.

If you still have time, please go back and review what you have already written and rephrase or rewrite as necessary until the 5 minutes is up.

[Page Break]

3

Think about the same memory you wrote earlier. This time, **you are your younger self again** (in first person), **but your wiser and more compassionate adult self is with you in the room**. Your adult self can intervene if you want her to. She can offer you compassion or provide new updated information based on what you know now, she can talk to you (or others), or do anything else that feels helpful and right in the situation.

Now take a moment to close your eyes and re-imagine the event as if it were happening to you right now. Remember, this time your adult self is with you and can intervene if you want her to.

Please only continue when you have completed the visualization.

[Page Break]

3

For the next 5 minutes, please write about what you see as if it were happening to you right now **but this time your adult self is with you and can intervene if you want her to**.

Please write in **first person** (e.g., I am in the change room, I am trying on a pair of blue jeans..) ***unless you are referring to the adult self*** (then use third person, e.g., "adult/older Sarah said…"). Like before, try to be as descriptive as you can, and provide details such as where you are, who you are with, what you can see, how you are feeling (emotions), and what is going through your mind (thoughts).

Please also describe what your wiser, more compassionate adult self does in the situation. (Reminder: She can offer you compassion or provide new updated information based on what you know now, she can talk to you [or others], or do anything else that feels helpful and right in the situation).

[Typing Space]

If you think you have finished before the time is up, go back and review what you have already written and rephrase or rewrite as necessary. Please try to keep going. After 5 minutes is up, the next button will appear and you may continue.

General IR

Please read the following carefully.

Please think about a recent negative event which might have left you **feeling bad about yourself as a person**. For example, it could be a social rejection or emotional neglect. **But it should NOT be an event that is specifically related to how you feel about your body or appearance.**

Some examples are:
being rejected by potential love interests
going through a really bad breakup
being treated poorly in a relationship
being verbally or emotionally abused by family members
being ostracized by people around you

Now take a moment to close your eyes and imagine (or visualize) this recent event as it is happening right now. Notice your thoughts and feelings that arise during this exercise.

Please only continue once you have this event in mind.

[Page Break]

1

Now reflect on those thoughts and feelings you just had, and try to identify the **earliest** event you could remember associated with them. That is, recall the earliest event that you could

remember which left you **feeling bad about yourself as a person**. It could be something that happened to you when you were a child, or a teenager. Again, take a moment to close your eyes and imagine this earlier event as it is happening right now. Notice your thoughts and feelings that arise.

Some examples are:
being treated poorly by family members
being mocked, teased, laughed at by friends
being bullied in school

Please only continue once you have this event in mind.

Remember, IT SHOULD NOT be an event that is specifically related to how you feel about your BODY or APPEARANCE.

[Page Break]

1

When you're ready, please write about this **earliest** event that you just recalled in the next 5 minutes.

Reminder: Write about the **earliest** memory you have of a negative event which might have left you **feeling bad about yourself as a person**. And it should **NOT** be an event that is specifically related to how you feel about your BODY or APPEARANCE.

Please write in **first person** and describe the event as it is happening **right now**. You should include as much details as you can such as where you are, what you are doing, who you are with, what you can see, how you are feeling (emotions), and what is going through your mind (thoughts).

[Typing Space]

Remember, write in first person, as it is happening right now.

If you think you have finished before the time is up, go back and review what you have already written and rephrase or rewrite as necessary. Please try to keep going. After 5 minutes is up, the next button will appear and you may continue.

[Page Break]

2

Now think about the same memory you wrote earlier. This time, when you close your eyes and imagine (or visualize) this event, imagine it **from an observer's perspective**. Imagine that your adult self is in the room observing what's happening to your younger self right now, watching the events unfold.

Now take a moment to close your eyes and imagine this event as if it were happening to your younger self right now.

Please only continue when you have completed the visualization.

[Page Break]

2

For the next 5 minutes, please write about what you see from an **observer's perspective** as if it were happening to your younger self right now.

Please write in **third person** (e.g., if your name is Sarah, write "I see Sarah being yelled at by her mother..."), and include as much details as you can such as where Sarah is, what Sarah is doing, who Sarah is with, how Sarah might be feeling (emotions), and what Sarah might be telling herself (thoughts).

Please describe what you see from **an observer's perspective** as if it were happening to your younger self right now.

[Typing Space]

Remember to write in **third person.**

When you're finished please take a minute to think about what needs to happen in the memory in order for your younger self to feel better or if there is anything your adult self would like to do to help the younger self in that situation.

If you still have time, please go back and review what you have already written and rephrase or rewrite as necessary until the 5 minutes is up.

[Page Break]

3

Think about the same memory you wrote earlier. This time, **you are your younger self again** (in first person), **but your wiser and more compassionate adult self is with you in the room**. Your adult self can intervene if you want her to. She can offer you compassion or provide new updated information based on what you know now, she can talk to you (or others), or do anything else that feels helpful and right in the situation.

Now take a moment to close your eyes and re-imagine the event as if it were happening to you right now. Remember, this time your adult self is with you and can intervene if you want her to.

Please only continue when you have completed the visualization.

[Page Break]

3

For the next 5 minutes, please write about what you see as if it were happening to you right now but this time your adult self is with you and can intervene if you want her to.

Please write in **first person** (e.g., my mother is yelling at me...) ***unless you are referring to the adult self*** (then use third person, e.g., “adult/older Sarah said…”). Like before, try to be as descriptive as you can, and provide details such as where you are, who you are with, what you can see, how you are feeling (emotions), and what is going through your mind (thoughts).

Please also describe what your wiser, more compassionate adult self does in the situation. (Reminder: She can offer you compassion or provide new updated information based on what you know now, she can talk to you [or others], or do anything else that feels helpful and right in the situation).

[Typing Space]

Remember to write in **first person *unless*** you're referring to your older self.

If you think you have finished before the time is up, go back and review what you have already written and rephrase or rewrite as necessary. Please try to keep going. After 5 minutes is up, the next button will appear and you may continue.

Psychoeducation

The results of your screening questionnaires indicated an increased level of weight concern, which can be a risk factor for eating disorders. Hence, we would like to invite you to read a handout about eating disorders and consider its relevance to you.

Please raise your hand and signify the researcher that you are at this page and you need a printed hand out. Alternatively you can use the link to download a pdf file if you prefer to read on a computer screen.

You should spend 10 mins on this task. Please do not proceed until the 10 mins is up.

To help you grasp the information in this handout, we prepared some questions for you. Please answer them to test your understanding of the handout, you can find all the answers in the handout you are given.

According to this handout....

1. Do you have to have psychological problems or trauma for an eating disorder to develop?

    A. Yes
    B. No

2. On average, about how much percentage of a risk of developing an eating disorder come from genetic influence?

    A. 0% (eating disorders have no genetic influence)
    B. 5% (eating disorders have minimal genetic influence)
    C. 50% (eating disorders have moderate genetic influence)
    D. 100% (eating disorders are completely genetically based)

3. Which one of the following statements describe how genes and environment interact in the case of eating disorders the best?

A. People who are born with a genetic predisposition to developing an eating disorders will develop an eating disorder regardless of the environment they are in.
B. People who are not born with a genetic predisposition to developing an eating disorders will not develop an eating disorder regardless of the environment they are in.
C. People with a higher heritability need only a slightly toxic environment for an eating disorder to manifest itself, while in a protected environment, even those with a high level of genetic vulnerability may not go on to develop an eating disorder.

4. In what way is the western culture increasing the risk of developing an eating disorder nowadays?

A. It places a high value on thinness
B. It places a high value on muscularity
C. The media portrays a lot of unachievable beauty standards
D. There are a lot of conflicting messages on the internet about diets and exercise
E. All of the above

5. When a person is not eating properly, starving him/herself for a sustained period of time, hence malnourished, which of the following aspects might be affected as a result?

A. Emotions regulation
B. Executive function of the brain (e.g., making decisions, solving problems)

C. Social behaviours (e.g., food became the central topic of conversation; The group initially bonded and was happy but then became more serious with more sarcasm and less humour)

D. Personality (e.g., Increased apathy, depression, tiredness, moodiness, irritability, anxiety, sensitivity to noise, restlessness.)

E. All of the above

6. Can the effects of starvation on the brain be reversed with adequate nourishment?

A. Yes

B. No

7. Is recovery from an eating disorder possible?

A. Yes

B. No

Now it's your chance to tell us what you've learned in this handout.*

Control

For the next 10 minutes, just sit and let your mind wander wherever it would like to, let your attention drift. There is no need to control your thoughts in any way, just let them wander. You may find that your mind wanders to thoughts about many different things or thoughts of nothing at all. You may find that your mind wanders to thoughts about the unpleasant body experience you described earlier. Wherever your mind wanders it's OK. Just think about whatever you like. Thoughts are not right or wrong. Just let your attention drift. After 10 minutes is up, the next button will appear and you may continue.

APPENDIX E: QUALITY RATING SCALE

For negative mood induction:

a) Personal Unpleasant Body/General Experience. The response describes a personal *unpleasant body experience* from the past where the participant felt ashamed or embarrassed of their body or how their body looked OR an *unpleasant general experience* from the past where the participant felt ashamed or embarrassed of themselves as a person. Where this is done well, the response is descriptive and includes details and emotions (e.g., where or when is the event taking place, what is taking place, who is present, how they might be the feeling [emotions], what they might be telling themselves [thoughts]).

An example of an excellent *body* response (a rating of 3) is: *"I am standing at the beach with a group of friends. I am worried and anxious but my friends look like they are having fun. I hide behind that oversized t-shirt and am wrapped in an extra towel. I am concerned about my body. The thoughts I am having now is making me overwhelmed and distressed and that this is the last place I would be comfortable."*

An example of an excellent *general* response (a rating of 3) is: *"I just came home from school, standing in the kitchen. I am telling my father that I won the second place of a poetry competition. My dad is asking me questions such as "why didn't you win the first place" which makes me think that he is not happy with my accomplishment. I feel angry and sad. I wonder if others will like me more if I get a better score."*

NB. Specify in text if the event participants wrote about (body/general) did not match with their allocated condition (1 = Body; 2 = General).

0 = no mention of unpleasant experience

1 = mentioned unpleasant experience but didn't describe in detail

2 = described unpleasant experience in detail but didn't mention emotions or thoughts

3 = described unpleasant experience in detail and described emotions and/or thoughts

For the IR compassionate step:

a) Personal Unpleasant Body/General Experience. The response describes a personal *unpleasant body experience* from the past where the participant felt ashamed or embarrassed of their body or how their body looked OR an *unpleasant general experience* from the past where the participant felt ashamed or embarrassed of themselves as a person. Where this is done well, the response is descriptive and includes details and emotions (e.g., where or when

is the event taking place, what is taking place, who is present, how they might be the feeling [emotions], what they might be telling themselves [thoughts]).

An example of an excellent *body* response (a rating of 3) is: *"I am standing at the beach with a group of friends. I am worried and anxious but my friends look like they are having fun. I hide behind that oversized t-shirt and am wrapped in an extra towel. I am concerned about my body. The thoughts I am having now is making me overwhelmed and distressed and that this is the last place I would be comfortable."*

An example of an excellent *general* response (a rating of 3) is: *"I just came home from school, standing in the kitchen. I am telling my father that I won the second place of a poetry competition. My dad is asking me questions such as "why didn't you win the first place" which makes me think that he is not happy with my accomplishment. I feel angry and sad. I wonder if others will like me more if I get a better score."*

NB. Specify in text if the event participants wrote about (body/general) did not match with their allocated condition (1 = Body; 2 = General).

0 = no mention of unpleasant experience

1 = mentioned unpleasant experience but didn't describe in detail

2 = described unpleasant experience in detail but didn't mention emotions or thoughts

3 = described unpleasant experience in detail and described emotions and/or thoughts

b) First/Third Person Language. The response describes a personal unpleasant body/general event in *both first and third person language*. Where this is done well, the response is written in the first person (e.g., "I am in the change room, I'm trying on a pair of blue jeans…") unless they are referring to their adult self, in which case this is written in the third person (e.g., *"adult Ellie said"*, *"older Ellie approached me"*). An example of an excellent response (a rating of 3) from BIR is: *"I am getting ready to go out for one of my best friend's birthdays. I am wearing a short black dress that belongs to my mum. I don't like it because I feel fat in it and you can see the outline of my stomach in the dress. I feel out of my comfort zone and wish I could change. Older Ellie steps in while I am turning around in the mirror trying to see if my stomach disappears from another angle, and she tells me that there is nothing there and that you can't see a thing, and tells me that it is only in my head and that I look beautiful."*

0 = not written in the first person *or* the third person

1 = written in the first person, but not in the third person (i.e., did not refer to their adult self)

2 = written in the third person, but not in the first person (i.e., did not refer to "I", refer to both younger self and older self in third person)

2 = written in both first person and third person, but the usage switches (sometimes first person refers to younger self and sometimes older self).

3 = written in the first person (i.e., when referring to the present) and written in the third person (i.e., when referring to their adult self)

c) Adult Self Present & Engaged. The response describes a personal unpleasant body/general experience and *their adult (or older) self is with them and intervenes or does something in the situation that is right or helpful*. Where this is done well, the response is descriptive and makes explicit reference to their adult self in the room as the events unfold (e.g., reference to "*adult Sarah*", "*older Sarah*", "*compassionate Sarah*") and describes details of their adult self intervening or doing something in the situation that is right or helpful (e.g., what is adult Sarah doing, what did adult Sarah say). An example of an excellent response (a rating of 3) from GIR is: *"I'm in the playground playing Cops and Robbers with my friends and classmates. One of the girls stops me and says she no longer wants me on her team because I am slower than the others. I feel crushed. Older Sarah comes up to me. She says not to worry about what others think of me because I have no idea what the future holds. She tells me I'm going to be successful and I'm going to work hard and achieve my dreams."*

0 = no mention of adult (or older) self present

1 = mentioned adult (or older) self present but no description of the adult self's action

2 = mentioned adult (or older) self present and described their adult self intervening or doing something in the situation but it was ambiguous from the description whether the intervention was helpful (i.e., "the adult self stood there and then walked away")

3 = mentioned adult (or older) self present and described their adult self intervening or doing something in the situation that is right or helpful (i.e., that may positively influence the situation)

d) Self-Compassion/Compassionate Language. The response describes a personal unpleasant body/general experience and their *wiser and more compassionate adult self is with them and offers them compassion or provides them with new updated information based on what they know now as an adult*. Where this is done well, the response is descriptive and includes an array of examples of compassionate intervening statements and/or gestures, and the response overall has a strong sense of compassion/self-compassion in the language used. An example of an excellent response (a rating of 3) from BIR is: *"I was at home trying on some old clothes. I was with older Amy. As I was trying to put on some old shorts, I realised they were too small for me. I start to become upset and stressed. Older Amy said to me "getting bigger is simply a part of growing older, you are not becoming fatter but becoming more like a woman, you look great just the way you are now"."*

0 = made no reference to intervening statements and/or gestures or the gestures were not compassionate.

1 = made reference to intervening statements and/or gestures that were compassionate, but the compassion/self-compassion is discounted and overall sense of the response is to minimize compassion/self-compassion (e.g., *Older Amy said to me "Yes getting bigger is a part of growing older, but you should still try to stay thin")*

2 = made reference to intervening statements and/or gestures that were compassionate, but limited more to factual information (*e.g., Older Amy said to me "don't worry, getting bigger is a part of growing older").*

3 = made reference to intervening statements and/or gestures that were compassionate, and contained a rich description of compassionate language (*e.g., older Anneliese steps in. She tells mum that I look amazing and that she is so proud I chose a good outfit.*)

APPENDIX F: IMAGERY RESCRIPTING THERAPIST NOTES AND PARTCIPANT HANDOUT (FACE-TO-FACE STUDY)

PAST IMAGERY UPDATING – THERAPIST NOTES

APPENDIX G: COPIES OF MEASURES

Weight Concerns Scale (WCS)

Killen, J. D., Hayward, C. H., Wilson, D. M., Taylor, C. B., Hammer, L. D., Litt, I., . . . Haydel, F. (1994). Factors associated with eating disorder symptoms in a community sample of 6th and 7th grade girls. *International Journal of Eating Disorders, 15*(4), 357-367.

Killen, J. D., Taylor, C. B., Hayward, C., Haydel, F., Wilson, D. M., Hammer, L. D., . . . Strachowski, D. (1996). Weight concerns influence the development of eating disorders: A four year prospective study. *Journal of Consulting and Clinical Psychology, 64*(5), 936-940.

Instructions: Please read the following questions carefully before answering.

For the following questions please select the best option on the right.

1.	How much <u>more or less</u> do you feel you worry about your weight and body shape than other women your age?	I worry a lot less than other women.	I worry a little less than other women.	I worry about the same as other women.	I worry a little more than other women.	I worry a lot more than other women.		
		○	○	○	○	○		
2.	How afraid are you of gaining 1.36kg (3lb)?	Not afraid	Slightly afraid	Moderately afraid	Very afraid	Terrified		
		○	○	○	○	○		
3.	When was the last time you went on a diet?	I've never been on a diet.	I was on a diet about one year ago.	I was on a diet about 6 months ago.	I was on a diet about 3 months ago.	I was on a diet about 1 month ago.	I was on a diet less than 1 month ago.	I'm now on a diet.
		○	○	○	○	○	○	○
4.	Compared to other things in your life, how important is your weight to you?	My weight is not important compared to other things in my life.	My weight is a little more important than some other things.	My weight is more important than most, but not all, things in my life.	My weight is the most important thing in my life.			
		○	○	○	○			
5.	Do you ever feel fat?	Never	Rarely	Sometimes	Often	Always		
		○	○	○	○	○		

Eating Disorder Examination – Questionnaire (EDE-Q)

Fairburn, C. G., & Beglin, S. J. (1994). Assessment of eating disorders: Interview or self-report questionnaire?. *International Journal of Eating Disorders, 16*, 363-370.

Instructions: The following questions are concerned with the past four weeks (28 days) only. Please read each question carefully. Please answer all of the questions. Thank you.

Questions 1 to 12: Please select the appropriate option on the right. Remember that the questions only refer to the past four weeks (28 days) only.

	On how many of the past 28 days.....	No days	1-5 days	6-12 days	13-15 days	16-22 days	23-27 days	Every day
1.	Have you been deliberately trying to limit the amount of food you eat to influence your shape or weight (whether or not you have succeeded)?	○	○	○	○	○	○	○
2.	Have you gone for long periods of time (8 waking hours or more) without eating anything at all in order to influence your shape or weight?	○	○	○	○	○	○	○
3.	Have you tried to exclude from your diet any foods that you like in order to influence your shape or weight (whether or not you have succeeded)?	○	○	○	○	○	○	○
4.	Have you tried to follow definite rules regarding your eating (for example, a calorie limit) in order to influence your shape or weight (whether or not you have succeeded)?	○	○	○	○	○	○	○
5.	Have you had a definite desire to have an empty stomach with the aim of influencing your shape or weight?	○	○	○	○	○	○	○
6.	Have you had a definite desire to have a totally flat stomach?	○	○	○	○	○	○	○
7.	Has thinking about food, eating or calories made it very difficult to concentrate on things you are interested in (for example, working, following a conversation, or reading)?	○	○	○	○	○	○	○
8.	Has thinking about your shape or weight made it very difficult to concentrate on things you are interested in (for example, working, following a conversation, or reading)?	○	○	○	○	○	○	○
9.	Have you had a definite fear of losing control over eating?	○	○	○	○	○	○	○
10.	Have you had a definite fear that you might gain weight?	○	○	○	○	○	○	○
11.	Have you felt fat?	○	○	○	○	○	○	○
12.	Have you had a strong desire to lose weight?	○	○	○	○	○	○	○

Questions 13 to 18: Please fill in the appropriate number in the boxes on the right. Remember that the questions only refer to the past four weeks (28 days).

Over the past four weeks (28 days).....

13.	Over the past 28 days, how many times have you eaten what other people would regard as an unusually large amount of food (given the circumstances)?	.....
14.	.....On how many of these times did you have a sense of having lost control over your eating (at the time that you were eating)?	.....

15.	Over the past 28 days, on how many **DAYS** have such episodes of overeating occurred (i.e., you have eaten an unusually large amount of food and have had a sense of loss of control at the time)?	.....
16.	Over the past 28 days, how many times have you made yourself sick (vomit) as a means of controlling your shape or weight?	.....
17.	Over the past 28 days, how many times have you taken laxatives as a means of controlling your shape or weight?	.....
18.	Over the past 28 days, how many times have you exercised in a "driven" or "compulsive" way as a means of controlling your weight, shape or amount of fat, or to burn off calories?	.....

Questions 19 to 21: Please select the appropriate option on the right. Please note that for these questions the term "binge eating" means eating what others would regard as an unusually large amount of food for the circumstances, accompanied by a sense of having lost control over eating.

19.	Over the past 28 days, on how many days have you eaten in secret (i.e. furtively)?	No days	1-5 days	6-12 days	13-15 days	16-22 days	23-27 days	Every day
	.....Do not count episodes of binge eating	○	○	○	○	○	○	○
20.	On what proportion of the times that you have eaten have you felt guilty (felt that you've done wrong) because of its effect on your shape or weight?	None of the times	A few of the times	Less than half	Half of the times	More than half	Most of the time	Every time
	.....Do not count episodes of binge eating	○	○	○	○	○	○	○
21.	Over the past 28 days, how concerned have you been about other people seeing you eat?	Not at all		Slightly		Moderately		Markedly
	.....Do not count episodes of binge eating	○	○	○	○	○	○	○

1

Questions 22 to 28: Please select the appropriate option on the right. Remember that the questions only refer to the past four weeks (28 days).

	Over the past 28 days	Not at all		Slightly		Moderately	Markedly	
22.	Has your weight influenced how you think about (judge) yourself as a person?	○	○	○	○	○	○	○
23.	Has your shape influenced how you think about (judge) yourself as a person?	○	○	○	○	○	○	○
24.	How much would if have upset you if you had been asked to weigh yourself once a week (no more, or less, often) for the next four weeks?	○	○	○	○	○	○	○
25.	How dissatisfied have you been with your weight?	○	○	○	○	○	○	○
26.	How dissatisfied have you been with your shape?	○	○	○	○	○	○	○
27.	How uncomfortable have you felt seeing your body (for example, seeing your shape in the mirror, in a shop window reflection, while undressing or taking a bath or shower)?	○	○	○	○	○	○	○
28.	How uncomfortable have you felt about others seeing your shape or figure (for example, in communal changing rooms, when swimming, or wearing tight clothes)?	○	○	○	○	○	○	○

What is your weight at present? (Please give your best estimate.) .....

What is your height? (Please give your best estimate.) .....

If female: Over the past three-to-four months have you missed any menstrual periods? .....

If so how many? .....

Have you been taking the 'pill'? .....

The Body Image-Acceptance and Action Questionnaire (BI-AAQ)

Sandoz, E. K., Wilson, K. G., Merwin, R. M., & Kate Kellum, K. (2013). Assessment of body image flexibility: The Body Image-Acceptance and Action Questionnaire. *Journal of Contextual Behavioral Science, 2*(1–2), 39-48. doi:10.1016/j.jcbs.2013.03.002

Instructions: Below you will find a list of statements. Please rate the truth of each statement as it applies to you. Please select the appropriate option on the right.

		Totally Agree	Agree	Disagree	Totally Disagree	Totally Agree	Agree	Disagree
1	Worrying about my weight makes it difficult for me to live a life that I value.	○	○	○	○	○	○	○
2	I care too much about my weight and body shape.	○	○	○	○	○	○	○
3	I shut down when I feel bad about my body shape or weight.	○	○	○	○	○	○	○
4	My thoughts and feelings about my body weight and shape must change before I can take important steps in my life.	○	○	○	○	○	○	○
5	Worrying about my body takes up too much of my time.	○	○	○	○	○	○	○
6	If I start to feel fat, I try to think about something else.	○	○	○	○	○	○	○
7	Before I can make any serious plans, I have to feel better about my body.	○	○	○	○	○	○	○
8	I will have better control over my life if I can control my negative thoughts about my body.	○	○	○	○	○	○	○
9	To control my life, I need to control my weight.	○	○	○	○	○	○	○
10	Feeling fat causes problems in my life.	○	○	○	○	○	○	○
11	When I start thinking about the size and shape of my body, it's hard to think of anything else.	○	○	○	○	○	○	○
12	My relationships would be better if my body weight and/or shape did not bother me.	○	○	○	○	○	○	○

Dysfunctional Attitude Scales - Short Form 1 (DAS-SF1)

Beevers, C. G., Strong, D. R., Meyer, B., Pilkonis, P. A., & Miller, I. W. (2007). Efficiently assessing negative cognition in depression: an item response theory analysis of the dysfunctional attitude scale. *Psychological Assessment, 19*(2), 199-209.

Instructions: The sentences below describe people's attitudes. Circle the number which best describes how much each sentence describes your attitude. Your answer should describe the way you think most of the time.

		Totally Agree	Agree	Disagree	Totally Disagree
1	If I don't set the highest standards for myself, I am likely to end up a second-rate person.	○	○	○	○
2	My value as a person depends greatly on what others think of me.	○	○	○	○
3	People will probably think less of me if I make a mistake.	○	○	○	○
4	I am nothing if a person I love doesn't love me.	○	○	○	○
5	If other people know what you are really like, they will think less of you.	○	○	○	○
6	If I fail at my work, then I am a failure as a person.	○	○	○	○
7	My happiness depends more on other people than it does me.	○	○	○	○
8	I cannot be happy unless most people I know admire me.	○	○	○	○
9	It is best to give up your own interests in order to please other people.	○	○	○	○

Clinical Perfectionism Questionnaire (CPQ)

Fairburn, C. G., Cooper, Z., & Shafran, R. (2003b). The Clinical Perfectionism Questionnaire. Unpublished manuscript, Department of Psychiatry, University of Oxford, UK

Instructions: This questionnaire is concerned with "perfectionism." By perfectionism, we mean trying to meet really high standards whether or not you actually succeed in reaching them. In this questionnaire we are only concerned with perfectionism that affects areas of life other than your eating, weight, or appearance.

Have you been trying to achieve high standards over the past month whether or not you have succeeded (excluding standards for your eating, weight or appearance)? **YES / NO**
Please circle YES or NO.

If so, in what areas of your life (other than eating, weight or appearance) has this applied? - for example, it might have been in your performance at work, at sport, at music, at home, etc. Please note these below:

_____
-

_____

Now, please place an "X" in the column below that best describes you over the past month.
Remember, do not count standards for your eating, weight or appearance.

	Over the past month…….	Not at all	Some of the time	Most of the time	All of the time
1	Over the past month, have you pushed yourself really hard to meet your goals?	○	○	○	○
2	Over the past month, have you tended to focus on what you have achieved, rather than on what you have not achieved?	○	○	○	○
3	Over the past month, have you been told that your standards are too high?	○	○	○	○
4	Over the past month, have you felt a failure as a person because you have not succeeded in meeting your goals?	○	○	○	○
5	Over the past month, have you been afraid that you might not reach your standards?	○	○	○	○
6	Over the past month, have you raised your standards because you thought they were too easy?	○	○	○	○
7	Over the past month, have you judged yourself on the basis of your ability to achieve high standards?	○	○	○	○
8	Over the past month, have you done just enough to get by?	○	○	○	○
9	Over the past month, have you repeatedly checked how well you are doing at meeting your standards (for example, by comparing your performance with that of others)?	○	○	○	○
10	Over the past month, do you think that other people would have thought of you as a "perfectionist"?	○	○	○	○
11	Over the past month, have you kept trying to meet your standards, even if this has meant that you have missed out on things?	○	○	○	○
12	Over the past month, have you avoided any tests of your performance (at meeting your goals) in case you failed?	○	○	○	○

Self-Compassion Scale-Short Form (SCS-SF)

Raes, F., Pommier, E., Neff, K. D., & Van Gucht, D. (2011). Construction and factorial validation of a short form of the Self-Compassion Scale. *Clinical Psychology & Psychotherapy, 18*(3), 250-255. doi:10.1002/cpp.70

Instructions: Please read each statement carefully before answering. To the right of each item, indicate how often you behave in the stated manner.

How do you typically react toward yourself in difficult times?...

		Almost Never	Rarely	Sometimes	Often	Almost Always
1	When I fail at something important to me I become consumed by feelings of inadequacy.	○	○	○	○	○
2	I try to be understanding and patient towards those aspects of my personality I don't like.	○	○	○	○	○
3	When something painful happens I try to take a balanced view of the situation.	○	○	○	○	○
4	When I'm feeling down, I tend to feel like most other people are probably happier than I am.	○	○	○	○	○
5	I try to see my failings as part of the human condition.	○	○	○	○	○
6	When I'm going through a very hard time, I give myself the caring and tenderness I need.	○	○	○	○	○
7	When something upsets me I try to keep my emotions in balance.	○	○	○	○	○
8	When I fail at something that's important to me, I tend to feel alone in my failure.	○	○	○	○	○
9	When I'm feeling down I tend to obsess and fixate on everything that's wrong.	○	○	○	○	○
10	When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people.	○	○	○	○	○
11	I'm disapproving and judgmental about my own flaws and inadequacies.	○	○	○	○	○
12	I'm intolerant and impatient towards those aspects of my personality I don't like.	○	○	○	○	○

The Fears of Self-Compassion Subscale of the Fears of Compassion Scales (FCS)

Gilbert, P., McEwan, K., Matos, M., & Rivis, A. (2011). Fears of compassion: Development of three self-report measures. *Psychology and Psychotherapy: Theory, Research and Practice, 84*(3), 239-255. doi:10.1348/147608310X526511

Instructions: Different people have different views of compassion and kindness. While some people believe that it is important to show compassion and kindness in all situations and contexts, others believe we should be more cautious and can worry about showing it too much to ourselves and to others. We are interested in your thoughts and beliefs in regard to expressing kindness and compassion towards yourself.

Below are a series of statements that we would like you to think carefully about and then select the option on the right that best describes how each statement fits you.

Please use this scale to rate the extent that you agree with each statement.

		Don't agree at all		Somewhat agree		Completely agree
1	I feel that I don't deserve to be kind and forgiving to myself.	○	○	○	○	○
2	If I really think about being kind and gentle with myself it makes me sad.	○	○	○	○	○
3	Getting on in life is about being tough rather than compassionate.	○	○	○	○	○
4	I would rather not know what being 'kind and compassionate to myself' feels like.	○	○	○	○	○
5	When I try and feel kind and warm to myself I just feel kind of empty.	○	○	○	○	○
6	I fear that if I start to feel compassion and warmth for myself, I will feel overcome with a sense of loss/grief.	○	○	○	○	○
7	I fear that if I become kinder and less self-critical to myself then my standards will drop.	○	○	○	○	○
8	I fear that if I am more self-compassionate I will become a weak person.	○	○	○	○	○
9	I have never felt compassion for myself, so I would not know where to begin to develop these feelings.	○	○	○	○	○
10	I worry that if I start to develop compassion for myself I will become dependent on it.	○	○	○	○	○
11	I fear that if I become too compassionate to myself I will lose my self-criticism and my flaws will show.	○	○	○	○	○
12	I fear that if I develop compassion for myself, I will become someone I do not want to be.	○	○	○	○	○
13	I fear that if I become too compassionate to myself others will reject me.	○	○	○	○	○
14	I find it easier to be critical towards myself rather than compassionate.	○	○	○	○	○
15	I fear that if I am too compassionate towards myself, bad things will happen.	○	○	○	○	○

Confidence to change

If you decided to work on improving the way you feel about your body, how confident are you that you would succeed?

Negative Affect Subscale of the Positive and Negative Affect Schedule (PANAS)

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.

Instructions: This scale consists of a number of words that describe different feelings and emotions. Please read each item and then select the appropriate option on the right.

Please indicate to what extent you feel this way <u>right now</u>, that is, at the present moment.

		Very Slightly or Not at All	A Little	Moderately	Quite a Bit	Extremely
1.	Distressed	○	○	○	○	○
2.	Upset	○	○	○	○	○
3.	Guilty	○	○	○	○	○
4.	Scared	○	○	○	○	○
5.	Hostile	○	○	○	○	○
6.	Irritable	○	○	○	○	○
7.	Ashamed	○	○	○	○	○
8.	Nervous	○	○	○	○	○
9.	Jittery	○	○	○	○	○
10.	Afraid	○	○	○	○	○

Body Image States Scale (BISS)

Cash, T. F., Fleming, E. C., Alindogan, J., & Steadman, L. A. Whitehead (2002),"Beyond Body Image as a Trait: The Development and Validation of the Body Image States Scale,". *Eating Disorders: The Journal of Treatment and Prevention*, *10*(2), 103-113.

Instructions: For each of the items below, check the box beside the one statement that best describes how you feel right now at this very moment. Read the items carefully to be sure the statement you choose accurately and honestly describes how you feel right now.

1. Right now I feel …
   - ☐ ***Extremely dissatisfied*** with my physical appearance
   - ☐ ***Mostly dissatisfied*** with my physical appearance
   - ☐ ***Moderately dissatisfied*** with my physical appearance
   - ☐ ***Slightly dissatisfied*** with my physical appearance
   - ☐ ***Neither dissatisfied nor satisfied*** with my physical appearance
   - ☐ ***Slightly satisfied*** with my physical appearance
   - ☐ ***Moderately satisfied*** with my physical appearance
   - ☐ ***Mostly satisfied*** with my physical appearance
   - ☐ ***Extremely satisfied*** with my physical appearance

2. Right now I feel …
   - ☐ ***Extremely satisfied*** with my body size and shape
   - ☐ ***Mostly satisfied*** with my body size and shape
   - ☐ ***Moderately satisfied*** with my body size and shape
   - ☐ ***Slightly satisfied*** with my body size and shape
   - ☐ ***Neither dissatisfied nor satisfied*** with my body size and shape
   - ☐ ***Slightly dissatisfied*** with my body size and shape
   - ☐ ***Moderately dissatisfied*** with my body size and shape
   - ☐ ***Mostly dissatisfied*** with my body size and shape
   - ☐ ***Extremely dissatisfied*** with my body size and shape

3. Right now I feel …
   - ☐ ***Extremely dissatisfied*** with my weight
   - ☐ ***Mostly dissatisfied*** with my weight
   - ☐ ***Moderately dissatisfied*** with my weight
   - ☐ ***Slightly dissatisfied*** with my weight
   - ☐ ***Neither dissatisfied nor satisfied*** with my weight
   - ☐ ***Slightly satisfied*** with my weight
   - ☐ ***Moderately satisfied*** with my weight
   - ☐ ***Mostly satisfied*** with my weight
   - ☐ ***Extremely satisfied*** with my weight

4. Right now I feel …
   - ☐ ***Extremely*** physically ***attractive***
   - ☐ ***Very*** physically ***attractive***
   - ☐ ***Moderately*** physically ***attractive***
   - ☐ ***Slightly*** physically ***attractive***
   - ☐ ***Neither attractive nor unattractive***
   - ☐ ***Slightly*** physically ***unattractive***
   - ☐ ***Moderately*** physically ***unattractive***
   - ☐ ***Very*** physically ***unattractive***
   - ☐ ***Extremely*** physically ***unattractive***

5. Right now I feel…
   - ☐ ***A great deal worse*** about my looks than I usually feel
   - ☐ ***Much worse*** about my looks than I usually feel

- ☐ ***Somewhat worse*** about my looks than I usually feel
- ☐ ***Just slightly worse*** about my looks than I usually feel
- ☐ ***About the same*** about my looks as usual
- ☐ ***Just slightly better*** about my looks than I usually feel
- ☐ ***Somewhat better*** about my looks than I usually feel
- ☐ ***Much better*** about my looks than I usually feel
- ☐ ***A great deal better*** about my looks than I usually feel

6. Right now I feel…
   - ☐ ***A great deal better*** than the average person looks
   - ☐ ***Much better*** than the average person looks
   - ☐ ***Somewhat better*** than the average person looks
   - ☐ ***Just slightly better*** than the average person looks
   - ☐ ***About the same*** as the average person looks
   - ☐ ***Just slightly worse*** than the average person looks
   - ☐ ***Somewhat worse*** than the average person looks
   - ☐ ***Much worse*** than the average person looks
   - ☐ ***A great deal worse*** than the average person looks

Depression, Anxiety and Stress Scale (DASS – 21)

Lovibond, P. F., & Lovibond, S. H. (1995). The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behaviour research and therapy*, *33*(3), 335-343.

Instructions: Please read each statement and circle a number 0, 1, 2 or 3 which indicates how much the statement applied to you over the past week. There are no right or wrong answers. Do not spend too much time on any statement.
The rating scale is as follows:
0 Did not apply to me at all - NEVER
1 Applied to me to some degree, or some of the time - SOMETIMES
2 Applied to me to a considerable degree, or a good part of time - OFTEN
3 Applied to me very much, or most of the time - ALMOST ALWAYS

		Never	Sometimes	Often	Almost Always
1	I found it hard to wind down	○	○	○	○
2	I was aware of dryness of my mouth	○	○	○	○
3	I couldn't seem to experience any positive feeling at all	○	○	○	○
4	I experienced breathing difficulty (e.g., excessively rapid breathing, breathlessness in the absence of physical exertion)	○	○	○	○
5	I found it difficult to work up the initiative to do things	○	○	○	○
6	I tended to over-react to situations	○	○	○	○
7	I experienced trembling (e.g., in the hands)	○	○	○	○
8	I felt that I was using a lot of nervous energy	○	○	○	○
9	I was worried about situations in which I might panic and make a fool of myself	○	○	○	○
10	I felt that I had nothing to look forward to	○	○	○	○
11	I found myself getting agitated	○	○	○	○
12	I found it difficult to relax	○	○	○	○
13	I felt down-hearted and blue	○	○	○	○
14	I was intolerant of anything that kept me from getting on with what I was doing	○	○	○	○
15	I felt I was close to panic	○	○	○	○
16	I was unable to become enthusiastic about anything	○	○	○	○
17	I felt I wasn't worth much as a person	○	○	○	○
18	I felt that I was rather touchy	○	○	○	○
19	I was aware of the action of my heart in the absence of physical exertion (e.g., sense of heart rate increase, heart missing a beat)	○	○	○	○
20	I felt scared without any good reason	○	○	○	○
21	I felt that life was meaningless	○	○	○	○

Clinical Impairment Assessment Questionnaire (CIA)

Bohn, K., & Fairburn, C. G. (2008). The clinical impairment assessment questionnaire (CIA). *Cognitive behavioral therapy for eating disorders*, 1-3.

Instructions: Please place an X in the column which best describes how your eating habits, exercising or feelings about your eating, shape or weight have affected your life over the past four weeks (28 days).

Over the past 28 days, to what extent have your
…eating habits
…exercising
…or feelings about your eating, shape or weight …

		Not at all	A little	Quite a bit	A lot
1	…made it difficult to concentrate?	○	○	○	○
2	…made you feel critical of yourself?	○	○	○	○
3	…stopped you going out with others?	○	○	○	○
4	…affected your work performance (if applicable)?	○	○	○	○
5	…made you forgetful?	○	○	○	○
6	…affected your ability to make everyday decisions?	○	○	○	○
7	…interfered with meals with family or friends?	○	○	○	○
8	…made you upset?	○	○	○	○
9	…made you feel guilty?	○	○	○	○
10	…made it difficult to eat out with others?	○	○	○	○
11	…made you feel guilty?	○	○	○	○
12	…interfered with you doing things you used to enjoy?	○	○	○	○
13	…made you absent-minded?	○	○	○	○
14	…made you feel a failure?	○	○	○	○
15	…interfered with your relationships with others?	○	○	○	○
16	…made you worry?	○	○	○	○

APPENDIX H: AUTHOR'S CURRICULUM VITAE

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