Doctorate in Clinical Psychology

The relationship between self-compassion and eating behaviour.

Running header: SELF-COMPASSION AND EATING BEHAVIOUR

Catharine Shipley

Supervised by:

Dr Charlotte Hardman

Dr Jo Harrold

Dr Valentina Lorenzetti

3rd June 2019

Submitted in partial fulfilment of the Doctorate in Clinical Psychology, University of Liverpool

Acknowledgements

I would like to thank my supervisors Charlotte Hardman (primary supervisor), Jo Harrold (secondary supervisor) and Valentina Lorenzetti (initial secondary supervisor) for their guidance and support. Thank you Charlotte and Jo for your thorough and excellent feedback, and your encouragement throughout this process, it is greatly appreciated.

I am also grateful for current influencers and leaders in the Body Positivity Movement, including Megan Crabbe (Bodyposipanda), Jameela Jamil, Chidera Eggerue, The Unedit, and the Anti-Diet Riot Club; who have provided insight and developed my understanding of the socio-cultural context surrounding body image and eating difficulties. They have also helped me to accept and appreciate my own body.

I am thankful for my family and friends who have been hugely supportive, and have provided endless reassurance and encouragement during moments of self-doubt. Finally, thank you Leo, for your seemingly infinite wisdom and kindness.

Table of Contents

List of Tables

Chapter 1

Chapter 2

List of Figures

Chapter 1

Chapter 2

List of Appendices

Word Count

(Including tables, figures and appendices)

Introductory Chapter

)4) definition of self-compassion involves treating ours

l understanding, especially when we suffer, fail or feel i

ivation to alleviate our suffering. Neff describes three c

-kindness versus self-criticism, common humanity vers

'suffer

'ering r

ocial c

ystema

g beha

ship. T

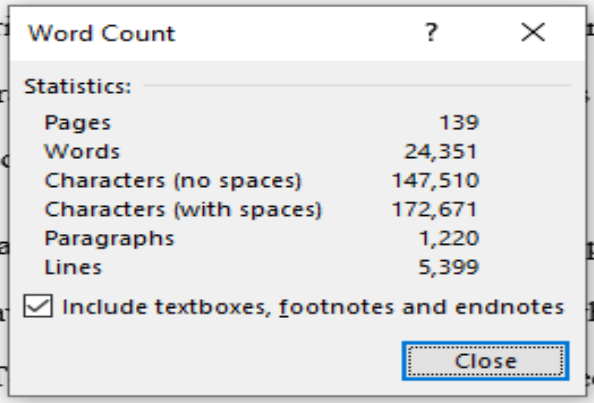
ments er

part of t

p betwee

hat mod

d systen



Introductory Chapter

Thesis Overview

Neff's (Neff, 2004) definition of self-compassion involves treating ourselves with warmth, kindness and understanding, especially when we suffer, fail or feel inadequate; combined with a motivation to alleviate our suffering. Neff describes three components of self-compassion: self-kindness versus self-criticism, common humanity versus isolation, and mindful awareness of suffering versus over-identification. These elements encourage us to acknowledge our suffering rather than avoid it and view suffering as part of being human, which can facilitate social connection (Neff, 2004).

Chapter one is a systematic review of research on the relationship between self-compassion and eating behaviour in a community population, and what moderates or mediates this relationship. To our knowledge, there are two published systematic reviews related to self-compassion and eating behaviour. Braun, Park, and Gorin (2016) examined the relationships between self-compassion, body image and disordered eating in clinical and community populations. Rahimi-Ardabili, Reynolds, Vartanian, McLeod, and Zwar (2018) reviewed interventions which aimed to influence eating behaviour and body weight by developing self-compassion. Both found evidence to suggest that higher self-compassion is associated with lower levels of disordered eating, including uncontrolled and overly-restrictive eating; and provided support for interventions which strengthen self-compassion for people seeking support for their eating, weight or negative body image. Both systematic reviews highlighted the emerging nature of this research and design limitations including cross-sectional data and a lack of diversity across samples. Therefore, further research is necessary to understand the relationship between self-compassion and eating behaviour, and the psychological mechanisms which help to explain it.

This review question was chosen due to the evolving research in this area which indicates a significant negative association between self-compassion and disordered eating; and emerging evidence on the moderators and mediators which help us to understand the psychological mechanisms which underpin this relationship (Braun et al., 2016). Previous studies indicate that there is a relationship but, at present, we do not really understand why this is. This systematic review seeks to address this gap in the knowledge. There are no published systematic reviews focusing more generally on these relationships in a community population, and further clarification is necessary to develop effective support for people struggling with their eating or weight. This systematic review aimed to review and summarise the research evidence in this area; highlight implications for clinical practice and service provision; and identify gaps in the research to guide further investigation. Eleven studies were included in the final paper.

Chapter two is an empirical study investigating the indirect effect of self-compassion on uncontrolled eating in a community sample of highly restrained eaters; via mediators related to a flexible approach to eating. Herman and Mack (1975) developed a counter-regulation model of restrained eating and demonstrated that people who adopt a rigid approach to dieting eat more when they break their dieting rules by eating food perceived as high-calorie, potentially due to the distress associated with failure. Adams and Leary (2007) found that restrained eaters who were asked to break their diet by eating a donut, subsequently ate less indulgent food if they heard a self-compassionate message, compared with restrained eaters who did not foster self-compassion. They proposed that self-compassion weakened the positive association between distress (triggered by breaking their diet) and subsequent over-eating. Research has shown a significant positive association between self-compassion and cognitive and behavioural flexibility, and between self-compassion and engagement in health promoting behaviours more generally (Dunne, Sheffield, & Chilcot, 2018; Sirois, Kitner, &

Hirsch, 2015; Terry, Leary, Mehta, & Henderson, 2013). Also, research has indicated a negative association between self-compassion and psychological distress (MacBeth & Gumley, 2012; Marsh, Chan, & MacBeth, 2018). Therefore, this current study hypothesised that restrained eaters who were more self-compassionate would be more in control of their eating, and this would be partly explained by a more flexible approach to dieting.

Evolving research in this area will further our understanding of the psychological processes which influence the relationship between self-compassion and eating behaviour. Ultimately, this will develop evidence-based practice and improve psychological interventions for people experiencing distress in relation to their eating or weight. Both chapters of this thesis will be submitted for publication in a peer-reviewed journal, the target journal is *Appetite*.

References

Adams, C. E., & Leary, M. R. (2007). Promoting Self–Compassionate Attitudes Toward Eating Among Restrictive and Guilty Eaters. *Journal of Social and Clinical Psychology*. https://doi.org/10.1521/jscp.2007.26.10.1120

Braun, T. D., Park, C. L., & Gorin, A. (2016). Self-compassion, body image, and disordered eating: A review of the literature. *Body Image*, *17*, 117–131. https://doi.org/10.1016/j.bodyim.2016.03.003

Dunne, S., Sheffield, D., & Chilcot, J. (2018). Brief report: Self-compassion, physical health and the mediating role of health-promoting behaviours. *Journal of Health Psychology*, *23*(7), 993–999. https://doi.org/10.1177/1359105316643377

Herman, C. P., & Mack, D. (1975). Restrained and unrestrained eating. *Journal of Personality*. https://doi.org/10.1111/j.1467-6494.1975.tb00727.x

MacBeth, A., & Gumley, A. (2012). Exploring compassion: A meta-analysis of the association between self-compassion and psychopathology. *Clinical Psychology Review*. https://doi.org/10.1016/j.cpr.2012.06.003

Marsh, I. C., Chan, S. W. Y., & MacBeth, A. (2018). Self-compassion and Psychological Distress in Adolescents—a Meta-analysis. *Mindfulness*. https://doi.org/10.1007/s12671-017-0850-7

Neff, K. D. (2004). Self-compassion and Psychological Well-being.pdf. *Constructivism in the Human Sciences*. https://doi.org/10.1037/e633942013-240

Rahimi-Ardabili, H., Reynolds, R., Vartanian, L. R., McLeod, L. V. D., & Zwar, N. (2018). A Systematic Review of the Efficacy of Interventions that Aim to Increase Self-Compassion on Nutrition Habits, Eating Behaviours, Body Weight and Body Image.

Mindfulness, *9*(2), 388–400. https://doi.org/10.1007/s12671-017-0804-0

Sirois, F. M., Kitner, R., & Hirsch, J. K. (2015). Self-compassion, affect, and health-promoting behaviors. *Health Psychology : Official Journal of the Division of Health Psychology, American Psychological Association*, *34*(6), 661–669. https://doi.org/10.1037/hea0000158

Terry, M. L., Leary, M. R., Mehta, S., & Henderson, K. (2013). Self-Compassionate Reactions to Health Threats. *Personality and Social Psychology Bulletin*. https://doi.org/10.1177/0146167213488213

Chapter One: Systematic Review

Is there an association between self-compassion and eating behaviour in a community population, and what moderates or mediates this relationship? A systematic review.

The Systematic Review will be submitted to Appetite for consideration for publication.

Abstract

Background: Research indicates a significant association between self-compassion and eating behaviour; particularly a negative association between self-compassion and disordered eating. However, the psychological mechanisms explaining this relationship are unclear. This systematic review explored the relationship between self-compassion and eating behaviour in an adult community population, and the associated moderators or mediators.

Design: Systematic review.

Method: Six online databases were screened: CINAHL Plus, PubMed, PsychINFO, MEDLINE, Scopus, and Web of Knowledge. Inclusion criteria: research published after 2003 (when self-compassion operationalised); adult participants from a community sample; quantitative methodology; self-compassion measured by the Self-Compassion Scale. Eleven papers were eligible for review.

Results: Six studies reported a negative association between self-compassion and types of disordered eating (uncontrolled eating, overly-restrictive eating and purging). Mediators included lower body shame; higher self-compassionate actions and higher body compassion (in serial); higher unconditional self-acceptance; and higher distress tolerance. Family pressure to be thin moderated the negative association between self-compassion and disordered eating (when family pressure was high the association was non-significant). Five studies measured health-related behaviour outcomes, including eating regular healthy meals, intuitive eating, and adherence to a gluten free diet. There was a positive association between self-compassion and engagement in health-related behaviour; and these relationships appeared to be explained by greater self-regulation.

Conclusion: Findings from six studies support a negative association between self-compassion and disordered eating; and this may be explained by greater self-regulation,

greater self-acceptance, and weaker internalisation of socio-cultural pressures to be thin. Five studies found a positive association between self-compassion and health-related behaviours. Future research should utilise more robust methodology; diverse samples of participants; qualitative designs; and co-design research with experts by experience.

Keywords: Self-compassion, eating behaviour, indirect effect, moderation, mediation.

Introduction

The relationship between self-compassion and eating behaviour is a promising area of research which has clinical implications for people experiencing difficulties with their eating, weight or body image (Braun et al., 2016; Rahimi-Ardabili et al., 2018). The Health Survey for England found that 26.2 % of adults have obesity and a further 35.2% are overweight; men are more likely than women to be overweight or obese and obesity levels are highest among ages 45-74 years (Public Health England, 2017). Worryingly, one in ten children has obesity by five years old and one in five children by eleven years old (Public Health England, 2017). Support in primary care often focuses on behavioural interventions, including psycho-education; monitoring diet, exercise and weight; and goal setting and problem solving. However, the effectiveness of primary care interventions is often negligible after 12 months (Booth, Prevost, Wright, & Gulliford, 2014). Importantly, a systematic review of eating and weight management interventions which incorporated self-compassion reported encouraging results (Rahimi-Ardabili et al., 2018).

Neff's (Neff, 2004) definition of self-compassion involves treating ourselves with warmth, kindness and understanding, especially when we suffer, fail or feel inadequate; combined with a motivation to alleviate our suffering. Neff describes three components of self-compassion: self-kindness versus self-criticism, common humanity versus isolation, and mindful awareness of suffering versus over-identification. These elements encourage us to acknowledge our suffering rather than avoid it and view suffering as part of being human, which can facilitate social connection (Neff, 2004). Consequently, this can strengthen our ability to tolerate difficult emotions and practice ways of managing distress. Also, by reducing self-criticism, self-compassion can increase non-judgemental awareness of personal flaws and inadequacies, as well as strengths, and this can facilitate emotional resilience and personal development. Breines and Chen (2012) found that people who were more self-

compassionate also reported greater motivation to adapt and make changes after experiencing a personal failure.

Gilbert (2010) believes compassion stems from human evolution and our need for social connection; particularly our capacity for attachment and bonding, which is associated with feelings of contentment, safety and connection. Self-compassion is a practice which nurtures the self and can change neurophysiological and immune systems; for example, soothing the threat system and facilitating emotion regulation (Davidson et al., 2003; Gilbert, 2009; Lutz, Brefczynski-Lewis, Johnstone, & Davidson, 2008).

Self-compassion appears to protect against psychological distress, including stress, anxiety and depression, among young people and adults (Macbeth & Gumley, 2012; Marsh, Chan, & Macbeth, 2018; Xavier, Pinto-Gouveia, Cunha, & Dinis, 2017). This may be due to greater self-awareness and acceptance of distress, and greater accuracy in self-evaluation; for example, non-judgemental responses to personal inadequacies and failures, and being able to recognise achievements and internalise positive feedback (Leary, Tate, Adams, Allen, & Hancock, 2007). Furthermore, self-compassion differs from self-esteem, because it emphasises unconditional self-acceptance and self-mastery, rather than social comparison with others or meeting external standards (Barnard & Curry, 2011; Neff, Hsieh, & Dejitterat, 2005). These benefits of self-compassion are particularly salient for people experiencing eating, weight or body image difficulties; who often report self-criticism, guilt and shame, in response to social comparison or stigma (Ferreira, Matos, Duarte, & Pinto-Gouveia, 2014; Ferreira, Pinto-Gouveia, & Duarte, 2013).

Braun, Park, and Gorin (2016) conducted a systematic review of the relationships between self-compassion, body image and disordered eating, and proposed that self-compassion may influence eating behaviour in four ways: 1) self-compassion may directly

influence eating behaviour, for example by reducing unhelpful eating behaviours such as binge eating or highly restrictive eating (Kelly, Vimalakanthan, & Miller, 2014); 2) self-compassion may prevent the occurrence of risk factors associated with unhelpful eating, such as negative body image. When people live in a culture where their bodies are consistently monitored and evaluated by others, they internalise the message that their value and worth is dependent on the perspective of others. When being thin is highly valued, this can result in people monitoring their bodies for flaws and inadequacies; it can also contribute to unhelpful eating behaviour and feelings of shame when people fail to meet society's standards of beauty (Liss & Erchull, 2015); 3) self-compassion may act as a moderator and influence the relationship between a risk factor and unhelpful eating behaviour, for example weakening the significant positive association between negative body image and disordered eating (Daye, Webb, & Jafari, 2014; Kelly, Carter, Zuroff, & Borairi, 2013); 4) self-compassion may be indirectly associated with eating via various mediational pathways between the predictor and outcome variable, through which risk factors operate. For example, higher self-compassion was associated with more self-compassionate actions, which in turn was associated with higher body compassion, which in turn was associated with lower levels of disordered eating (de Carvalho Barreto, Ferreira, Marta-Simões, & Mendes, 2018). Building on these ideas, the current systematic review will examine potential moderators or mediators of the relationship between self-compassion as the predictor variable and outcomes related to eating behaviour.

Research has shown that people who are more self-compassionate also report less unhelpful eating behaviour, including highly restrictive eating and uncontrolled binge eating (Braun, Park, & Gorin, 2016; Kelly et al., 2014). Kelly et al., (2014) found that people diagnosed with an eating disorder reported higher fear of self-compassion (a fundamental fear of expressing kindness and compassion towards oneself) compared to people not diagnosed, measured by the Fears of Compassion Scales (Gilbert, McEwan, Matos, & Rivis, 2011). An

example item is *"I feel that I don't deserve to be kind and forgiving to myself"*. Fear of self-compassion predicted disordered eating among people diagnosed with an eating disorder; however, it did not predict disordered eating among a control sample of undergraduate students who did not meet the criteria for diagnosis. In comparison, low self-compassion predicted disordered eating among the control group. This suggests that the psychological mechanisms underpinning disordered eating among people diagnosed with an eating disorder may differ from those who do not meet the criteria and may reflect a more extreme and core fear of self-compassion.

Ferreira, Pinto-Gouveia, and Duarte (2013), compared women diagnosed with an eating disorder and women from a community population who were not diagnosed; and found that women with an eating disorder reported significantly lower self-compassion, and higher self-critical judgement, external shame, depression, anxiety, stress, drive for thinness, bulimia, and body dissatisfaction, in relation to the non-clinical group. In both groups self-compassion was negatively correlated with drive for thinness and symptoms of bulimia; however, there were stronger correlations among women diagnosed with an eating disorder. Also, lower self-compassion mediated the positive relationship between external shame (feeling judged by others) and drive for thinness. To summarise, findings suggest that the psychological mechanisms which help to explain disordered eating among people from clinical and non-clinical populations may differ (Lowe et al., 1996).

Kelly et al., (2016) highlighted the influence of trait and state self-compassion on body image and eating behaviour among undergraduate students, by asking them to complete daily measures over seven days. On days when participants were more self-compassionate, they also reported greater satisfaction with their bodies and ate more intuitively, with less restraint. Also, a woman's average level of self-compassion over the week predicted their average level of body satisfaction, intuitive eating, and eating restraint; indicating that although these traits

fluctuated daily, they were also relatively stable over time. Kelly et al., (2016) proposed that self-compassion can help people tolerate the distress triggered by negative body image and reduce subsequent emotionally driven urges to over or under-eat.

Liss and Erchull (2015) also explored self-compassion as a protective factor against negative body image and negative eating attitudes, between two groups of participants; one group reported low self-compassion and the other group scored highly. Participants who were more self-compassionate reported less surveillance of their bodies in response to social pressure to be thin; and lower body shame and negative eating attitudes. Further exploration indicated that women who were more self-compassionate who observed and monitored their bodies, subsequently experienced less shame and negative eating attitudes, compared to women lower in self-compassion. This further emphasises that self-compassion can facilitate emotion regulation, by reducing self-judgement in situations which could trigger strong emotions such as shame, which can subsequently impact eating behaviour.

Herman and Mack (1975) reported that dieters eat more than non-dieters after eating food perceived as high-calorie. Other factors which produced this counter-regulation effect included alcohol, anxiety and depression, whereas they reduced eating among non-dieters (Polivy, Heatherton, & Herman, 1988). Polivy, Heatherton, and Herman (1988) found that self-esteem moderated this counter-regulation effect, whereby dieters who reported lower self-esteem ate significantly higher quantities of high-calorie food after drinking a chocolate milkshake, compared to dieters who were higher in self-esteem. They hypothesised that uncontrolled eating might lower a dieter's self-esteem, making the person more vulnerable to uncontrolled eating in the future, and becoming a maintaining factor in their eating or weight difficulties. Uncontrolled eating refers to a tendency to over-eat, with the feeling of being out of control (Angle et al., 2009).

The Dual Pathway Model of Bulimia Nervosa, incorporates the counter-regulation hypothesis developed by Herman and Mack (1975), and describes two pathways which may contribute to disordered eating due to socio-cultural pressure to be thin (Stice, Nemeroff, & Shaw, 2011). Socio-cultural pressure is internalised and contributes to thinness being highly valued and body dissatisfaction. In turn, body dissatisfaction is associated with higher eating restraint and higher negative affect, which both contribute to subsequent disordered eating.

In a lab-based experiment, Adams and Leary (2007) extended the study by Polivy, Heatherton, and Herman (1988) and asked participants who were highly restrained eaters to break their diet by eating a donut and measured their subsequent food intake; while also exploring the influence of self-compassion. Participants who heard a self-compassionate message while eating the donut, ate less 'indulgent' food afterwards (like non-restrained eaters), when compared with participants who were not primed by self-compassion. Adams and Leary (2007) proposed that self-compassion like self-esteem, moderated the positive association between negative emotions triggered by breaking their diet and disinhibited eating, thus resulting in greater self-regulation.

Emerging evidence supports the effectiveness of interventions which incorporate self-compassion for body image, eating or weight difficulties (Rahimi-Ardabili et al., 2018). Interventions included a combination of yoga, self-compassion, mindful eating, intuitive eating and fitness (Braun, Park, & Conboy, 2012); food diaries to stimulate a mindful and self-compassionate approach to eating at meal times (Mantzios & Wilson, 2014); and daily guided meditation incorporating mindfulness and self-compassion (Mantzios & Wilson, 2015). All three studies reported significant weight loss for participants in the intervention group, compared to the control group.

More generally, people who report higher self-compassion also report greater engagement in health promoting behaviours, potentially because they extend the same care to themselves as they would give to others (Terry & Leary, 2011). Terry and Leary (2011) hypothesised that people who are more self-compassionate might respond to their health needs more often and self-regulate better; by setting more realistic and flexible health goals, and goals which aim to enhance wellbeing and happiness, rather than feelings of self-worth in response to external social pressure. Terry, Leary, Mehta, and Henderson (2013) found that people who were more self-compassionate experienced less distress in response to health threats and this was explained by greater kindness directed towards the self and benevolent self-talk. They also found that people who were more self-compassionate were more likely to seek medical attention and act on professional advice. Homan and Sirois (2017) found a positive association between self-compassion and physical health; via lower perceived stress (the degree to which participants found their lives to be unpredictable, uncontrollable and overwhelming) and greater engagement in positive health behaviours, such as discussing health concerns with professionals and engaging in regular exercise.

This area of research is critically important for understanding the myriad of complex factors which influence and maintain the psychological and physical distress associated with eating and weight difficulties. Emerging research suggests self-compassion is an important protective factor which can facilitate our ability to self-regulate emotions and behaviour. Further research is necessary to establish our understanding of the relationship between self-compassion and eating behaviour, and ultimately develop effective support to reduce distress and improve quality of life for people experiencing these difficulties.

Aim of this review

This systematic review aimed to evaluate and summarise the research evidence on the association between self-compassion and eating behaviour in an adult community sample, and the influence of mediators or moderators of this relationship. This review did not include research with participants diagnosed with an eating disorder; because the underlying psychological mechanisms which underpin eating behaviour between clinical and community populations are likely to differ. Furthermore, Braun, Park, and Gorin (2016) summarised research on the relationships between self-compassion and disordered eating among clinical populations in a recent systematic review; and less is known about the relationship in non-clinical samples.

Mediators explain the relationship between variables, for example how the Independent Variable interacts with the Dependent Variable; whereas moderators influence the relationship between other variables (Hayes, 2013). This review will identify gaps in the literature to guide further investigation and highlight implications for clinical practice and service provision.

Method

A systematic review protocol was designed using the PRISMA guidelines (Moher, Liberati, Tetzlaff, Altman, & The PRISMA Group, 2009). The protocol was registered on PROSPERO (registration number: CRD42019123713), which is a database to minimise duplications of reviews and reduce reporting bias via comparison with the original protocol (PROSPERO, 2017).

Study identification

Six online databases were searched for relevant papers: CINAHL Plus (from the year 1937), MEDLINE (from the year 1948), PsychINFO (from the year 1887), PubMed (from the year 1950), Scopus (from the year 1823) and Web of Science (from the year 1898). Included articles were published between 2003, when Neff (2004) operationalised her definition of self-compassion and standardised the Self-Compassion Scale (Neff, 2003), and October 2018, when searches were conducted for this review (see Appendix C). Search terms were developed utilising previous systematic reviews in this subject area (Braun et al., 2016; Rahimi-Ardabili et al., 2018) and the associated references. The search was conducted using the search terms in Table 1.1. The references of systematic reviews and key studies were also reviewed for relevant papers. Additionally, experts in the topic area were contacted by email to inquire about studies or systematic reviews due to be published. Three researchers were contacted by email with the references identified for the current review attached, and asked about pertinent research which may have been overlooked or relevant on-going research not yet published. One researcher responded, with no additional studies to be included.

Table 1.1.

Terms Used for Search Strategy Within Online Databases.

Variable	Alternative search terms used
Self-compassion	"Self compassion"
AND	
Mediator	"Mediation" OR "mediating" OR "mediating variable"
OR	
Moderator	"Moderation" OR "moderating" OR "moderating variable"
AND	
Eating behaviour	"Eating" OR "eating behav*" OR "eating habits" OR "diet" OR "dieting" OR "dietary intake" OR "dietary adherence" OR "food intake" OR "food consumption" OR "food restriction" OR "intuitive eating" OR "healthy eating" OR "emotional eating" OR "disordered eating" OR "eating disinhibition" OR "dietary restraint" OR "maladaptive eating" OR "rigid dietary restraint" OR "uncontrollable eating" OR "restrained eating" OR "dieting" OR "negative eating attitudes" OR "global eating pathology" OR "binge" OR "binge eating".

Note. Truncation * and the Boolean operator OR were used to widen the search. The Boolean operator AND was used to focus the search by requiring all three variables to be present to meet the criteria for the review.

Eligibility criteria

This review considered quantitative methodology. The inclusion criteria were as follows: 1) Must be conducted with adult human participants aged 18 years and above; 2) from a non-

clinical/community sample, i.e. participants who have not been assessed as having an eating disorder. This is because the psychological mechanisms which underpin eating behaviour in clinical and community populations are likely to differ; 3) examine the relationship between self-compassion as the independent variable and eating behaviour as the dependent variable, and the influence of one or more mediating or moderating variables. 4) measure self-compassion using the Self-Compassion Scale (Neff, 2003) or utilise Neff's definition of self-compassion (Neff, 2004); 5) peer reviewed.

Studies were excluded if they were published prior to 2003, when Neff operationalised her definition of self-compassion and standardised the Self-Compassion Scale (Neff, 2004; Neff, 2003), which is in keeping with recent systematic reviews by Braun, Park, and Gorin (2016) and Rahimi-Ardabili et al., (2018).

Screening and selection

Mendeley was used for direct exportation of citations from the internet and online databases. Search results from each database were imported into separate Mendeley reference manager files. Those files were then combined, and duplicate articles were deleted. Screening and selection was conducted in two phases: stage 1) titles and abstracts were screened and the inclusion criteria was applied; 2) full-text papers were selected and screened, and the inclusion criteria was applied; 3) references of identified studies were screened for eligible papers; 4) Experts in the topic area were contacted to inquire about on-going studies or systematic reviews and/or those due to be published.

Data extraction and synthesis

Table 1.2 outlines the data extracted from the studies included in the systematic review. The characteristics considered included: study design; where and when the study was conducted; number of participants and dropouts; demographic information including age in years, gender and ethnicity; interventions and comparators, if appropriate; study outcomes (including primary and secondary outcomes); analyses; number of participants included in analyses; study sponsorship; measures used; examined mediator or moderator; findings, including the effect sizes and confidence intervals of the relationship between self-compassion and eating behaviour, and the relationships between self-compassion and eating behaviour, via the mediator or moderator.

Assessment of study quality

Two tools were used to assess study quality, the 16-item Quality Assessment Tool for Studies with Diverse Designs (QATSDD) (Sirriyeh, Lawton, Gardner, & Armitage, 2012) which shows good reliability and validity (see Appendix A); and a tool adapted from a systematic review by Plassman, Williams, Burke, Holsinger, & Benjamin (2010) (see Appendix B). Various quality assessment tools are available; however, many have been developed for specific study designs. For example, The Cochrane Collaboration's tool is popular for assessing risk of bias in randomised trials (Higgins et al., 2011) or the Newcastle-Ottawa Scale for assessing the quality of non-randomised studies in meta-analyses, including cohort and case control studies (Wells et al., 2012). Sanderson, Tatt, and Higgins, (2007) conducted a systematic review of tools for assessing quality and susceptibility to bias in observational studies and concluded that there was no obvious single tool for assessing quality. However, they preferred a checklist type tool compared to scales; because items on a

scale are weighted differently, for example some items are more directly related to the validity of a study's findings (such as sample size calculations). This can result in inconsistent ratings across studies and do not always reflect an accurate assessment of quality.

In view of the above, this review combined two types of assessment tool to facilitate reflection, provide an in-depth critical analysis and reduce bias in scoring. The QATSDD (Sirriyeh et al., 2012) has 12 items which relate to quantitative and qualitative studies, and then two questions for quantitative or qualitative only. Each item is scored on a scale of zero to three, with a higher score reflecting higher quality (see Appendix A). Each study is given a percentage score for quality, which is easily accessible for the reader. To complement this, the tool used by Plassman et al., (2010) is a checklist which provides scoring guidance in relation to nine potential types of bias (see Appendix O). Each criterion is graded as "Yes", "No", "Partially" or "Can't Tell", with a written rationale for the grade. This qualitative feedback provides a richer analysis of each study, in addition to a percentage score.

Each study was quality assessed independently by two reviewers, with scores then cross-checked for consistency. A summary of the quality assessment using the QATSDD (Sirriyeh et al., 2012) for each study, is outlined in Table 3. See Appendix O for the checklist summary using the tool developed by Plassman et al., (2010).

Results

The initial search of online databases identified a total of 779 articles. After deleting duplicates and screening titles and abstracts, 91 papers appeared to meet the criteria and the full texts were examined for eligibility. The 11 articles included in the final review are outlined in Table 1.2 (Breines, Toole, Tu, & Chen, 2014; de Carvalho Barreto, Ferreira,

Marta-Simões, & Mendes, 2018; Dowd & Jung, 2017; Dunne, Sheffield, & Chilcot, 2018; Maraldo, Zhou, Dowling, & Vander Wal, 2016; Schoenefeld & Webb, 2013; Sirois, 2015; Sirois, Kitner, & Hirsch, 2015; Taylor, Dais, & Krietsch, 2015; Tylka, Russell, & Neal, 2015; Webb & Forman, 2013). Figure 1 is a PRISMA flow diagram of the article screening and selection process.

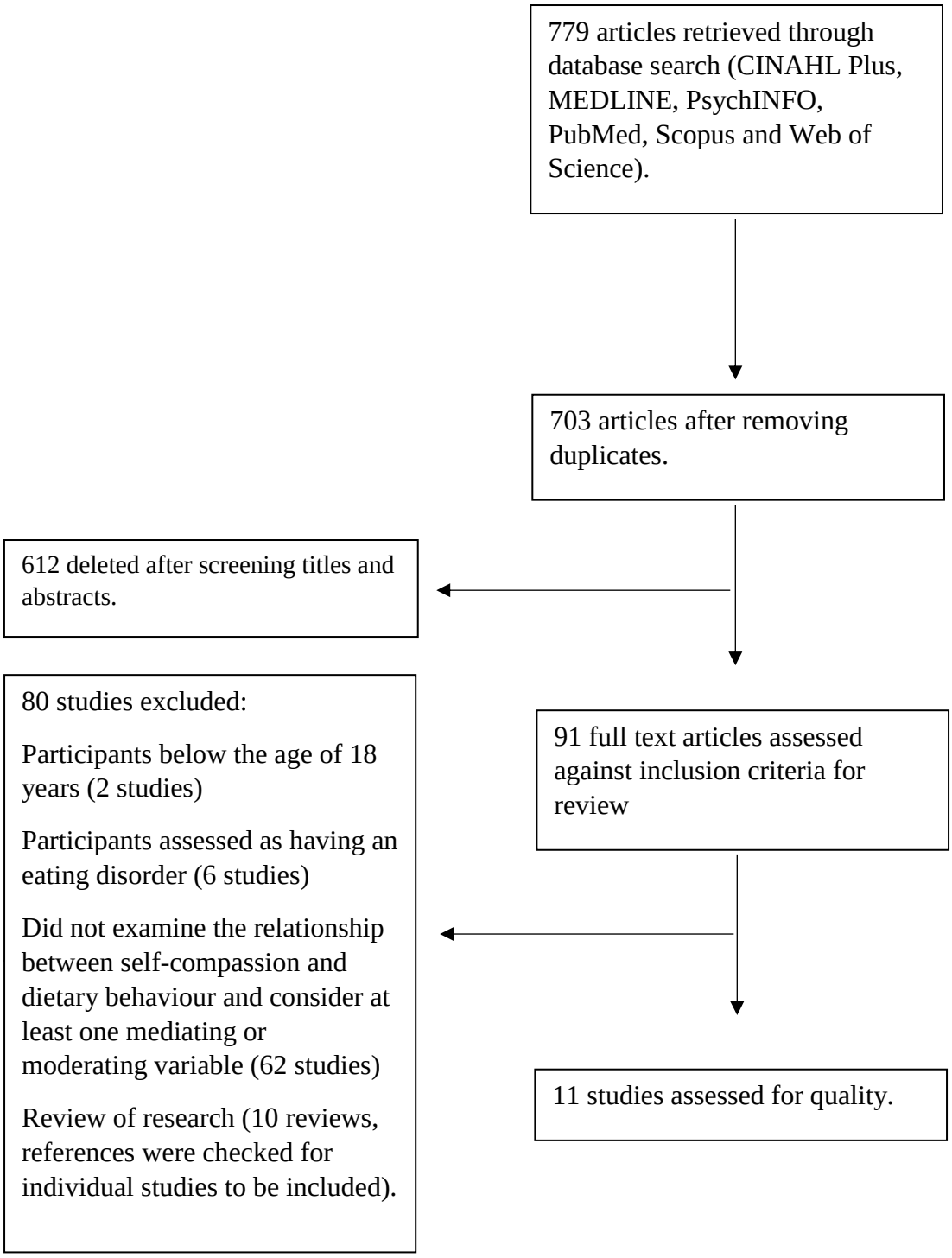


Figure 1.1 PRISMA flow diagram of the article screening and selection process.

Table 1.2. Summary of the design and outcomes for 11 studies reviewed. Abbreviations and asterisks are defined in the footnote. *M* = Mean; *SD* = Standard Deviation; (-) = negative association; (+) positive association; Significant results *Italicised*, * Significant < 0.05, ** Significant < 0.01, *** Significant ≤ 0.001, non-significant > 0.05.

First author, country, year of publication	Primary focus of article	Sample characteristics (*N*)	Age (years)	Methodology	Design	Data collection method	Measurement tools	Reported outcome	Quality (%)
Breines et al., USA (Brandeis University, Waltham and University of California, Berkeley), 2014.	Study 1: 4 day daily diary study on the relationship between appearance-related self-compassion and disordered eating.	*N* = 95 female undergrads, 52% Asian-American, 22% European-American, 13% Latino-American, 1% African-American, 12% other ethnicity.	18-28 years, *M* = 20.05, *SD* = 1.84.	Quantitative, Hierarchical Linear Modelling (can account for missing data). Well suited for multi-level and repeated measures analyses.	Longitudinal.	Daily self-report measures of key variables. 8 participants missed 1 diary entry but were included in the analysis.	Demographics, adapted 26-item Self-Compassion Scale (SCS) with 10 items, adapted Rosenberg Self-Esteem Scale with 2 items, modified Eisenberg and Neumark-Sztainer scale for disordered eating.	**** (-) association between appearance related self-compassion and disordered eating, when controlling for self-esteem.* Self-esteem was not a significant predictor of disordered eating.	69%
	Study 2: Indirect effect of self-compassion on anticipated disordered eating, and weight gain concern as a reason for restrained eating, via body shame.	*N* = 158 (female undergrads, 57% Asian-American, 26% European-American, 9% Latino-American, 2% African-American, 6% other ethnic groups.	18-42 years, *M* = 20.82, *SD* = 3.86.	Quantitative, bootstrapping analyses using PROCESS macro in SPSS.	Experimental, asked to reflect on appearance flaw, then given chocolate to eat, compared restrained and non-restrained eaters.	Self-report measures Amount of chocolate eaten in lab setting (kg) as a measure of restrained eating.	Adapted 12 item SCS (6 items), self-esteem (1 item), modified Body Shame Sub-scale of Objectified Body Consciousness Scale, modified Eisenberg and Neumark-Sztainer Scale for disordered eating.	*(-) association between self-compassion and disordered eating via lower body shame (LLCI = -.1565, ULCI = -.0140).* *(-) association between self-compassion and weight gain concern reasons for restrained eating, via lower body shame* LLCI = *-.1818, ULCI = -.0226).*	

First author, country, year of publication	Primary focus of article	Sample characteristics (*N*)	Age (years)	Methodology	Design	Data collection method	Measurement tools	Reported outcome	Quality (%)
De Carvalho-Barreto et al., Portugal (Coimbra), 2018.	Indirect effect of self-compassion attributes on disordered eating, via self-compassion actions and body compassion (in serial).	*N* = 299 women from general population. Years of education, *M* = 15.39 (*SD* = 2.12).	18 - 56 years (*M* = 29.08 years, *SD* = 10.18 years).	Quantitative, path analyses using Analysis of Momentary Structure software.	Cross-sectional.	Self-report measures Self-reported BMI: current weight (kg) divided by height squared (Metres).	Demographics, Compassionate Engagement and Actions Scales, Body Compassion Scale, Eating Disorder Examination Questionnaire.	*(-) association between self-compassionate attributes and disordered eating, via higher self-compassionate actions (mediator 1) and higher body compassion (mediator 2), LLCI = -0.33, ULCI = -0.18).*	74%
Dowd et al., Canada (British Columbia), 2017.	Indirect effect of self-compassion on adherence to a gluten free diet, via self-regulatory efficacy, and concurrent self-regulatory efficacy.	*N* = 220 at baseline (202 females, 17 males, 1 non-binary person) with blood test/biopsy confirmed Celiac Disease. Years since diagnosis: *M* = 7.85, *SD* = 7.85.	18 years and older, (*M* = 44.01 years, *SD* = 13.33 years).	Quantitative. Bootstrapping analyses using SPSS	Longitudinal.	Self-report measures *N* = 200 completed follow up measures one month later.	Demographics, adherence to a gluten free diet 7 item measure, gluten consumption over week, 26 item SCS, self-regulatory efficacy (revised 6 item measure).	*(+) association between self-compassion and adherence to a gluten free diet, via higher self-regulatory efficacy (LLCI = 0.012, ULCI = 0.124).* Non-significant via concurrent self-regulatory efficacy (the ability to adhere to a gluten free diet while pursuing other life goals).	83%

First author, country, year of publication	Primary focus of article	Sample characteristics (*N*)	Age (years)	Methodology	Design	Data collection method	Measurement tools	Reported outcome	Quality (%)
Dunne et al., UK (Derby), 2018.	Indirect effect of self-compassion on physical health (diet included), via health promoting behaviours.	*N* = 147 (28 male, 119 female). Employment: 46 students, 95 employed, 6 unemployed.	21 – 60 years (*M* = 32.28 years, *SD* = 9.6 years).	Quantitative. Bootstrapping analyses using SPSS.	Cross-sectional.	Self-report measures.	Demographics, 26 item SCS, Symptoms of Illness Checklist (31 items), Wellness Behaviours Inventory.	*(-) association between self-compassion and severity of physical health difficulties, via greater engagement in health promoting behaviours (LLCI = -6.78, ULCI = -0.86).*	52%
Maraldo et al., US (St Louis), 2016.	Extended Dual Pathway Model of Disordered Eating; self-compassion as a predictor of thin ideal, body dis-satisfaction and eating restraint.	*N* = 609 female participants (313 community participants and 296 students), BMI (*M* = 27.73, *SD* = 8.28 for community sample; (*M* = 23.25, *SD* = 4.37 for student sample).	18-65 years (*M* = 34.74 years, *SD* = 11.36 years. For community sample; (*M* = 19.44 years, *SD* = 1.75 years).	Quantitative, path analyses using Analysis of Momentary Structure software to test several models including self-compassion.	Cross-sectional.	Self-report measures.	12-item SCS, Eating Disorders Examination-Questionnaire, Bulimia Test-Revised, Dutch Eating Behaviour Questionnaire-Restrained Eating Subscale, Positive and Negative Affect Scales-Expanded.	*Self-compassion as a predictor of thin-ideal was a good fit within the wider model of disordered eating, (-) association between self-compassion and disordered eating via lower thin ideal, lower body dissatisfaction, lower eating restraint and lower negative affect. Self-compassion as a predictor of body dissatisfaction was a slightly better fit and therefore retained.*	74%

First author, country, year of publication	Primary focus of article	Sample characteristics (*N*)	Age (years)	Methodology	Design	Data collection method	Measurement tools	Reported outcome	Quality (%)
Schoenefeld et al., US (North Carolina), 2013.	Indirect effect of SC on intuitive eating, via distress tolerance and body image acceptance and action.	*N* = 322 female participants, European American (67.4%), African American (21.1%), Latina (5.8%), Asian (3.2%), American Indian (1.6%), or a Hawaiian or other Pacific Island (1.0%).	18 – 24 years (*M* = 19.48 years, *SD* = 1.46 years).	Quantitative, Bootstrapping analyses using SPSS Macro (Preacher & Hayes, 2008).	Cross-sectional.	Self-report measures.	26 item SCS, Distress Tolerance Scale, Body Image Acceptance and Action Questionnaire, Intuitive Eating Scale, Rosenberg Self-Esteem Scale.	** *(+) association between self-compassion and intuitive eating, (+) association between self-compassion and intuitive eating via distress tolerance and body image acceptance and action (LLCI = 0.22, ULCI = 0.42).* The effect was mostly driven by body image acceptance and action.	71%
Sirois et al., Canada (Quebec), 2015.	Indirect effect of self-compassion on health promoting behaviour, via positive and negative affect.	*N* = 3232, data from 15 independent samples (seven undergraduate and eight community samples collected over a 6-year period from 2007 to 2013 as part of a larger research program).	18 years and older. Demo-graphic data for each sample provided in paper.	Quantitative. Meta-analysis of eight samples recruited by same researchers. Bootstrapping analyses using SPSS.	Cross-sectional.	Self-report measures.	12 item and 26 item SCS, Wellness Behaviours Inventory, Positive and Negative Affect Scales.	*** *(+) association between self-compassion and practice of positive health behaviours. (+) association between self-compassion and health promoting behaviour, via higher positive affect and lower negative affect (LLCI = 0.09, ULCI = 0.20).*	79%

First author, country, year of publication	Primary focus of article	Sample characteristics (*N*)	Age (years)	Methodology	Design	Data collection method	Measurement tools	Reported outcome	Quality (%)
Sirois, Canada (Quebec), 2015.	Indirect effect of self-compassion on health promoting behaviour, via health self-efficacy, and positive and negative affect.	*N* = 403 (83.9% female, (75.4% identified as White, 96.3% university educated, 63.9% healthy weight, 10.1% underweight, 17.1% overweight, 6.7% obese).	18-25 years. (*M* = 20.37 years; *SD* = 1.87 years).	Quantitative. Bootstrapping analyses using SPSS.	Cross-sectional.	Self-report measures.	26 item SCS, Participants rated their intentions to engage in health enhancing behaviours on a 9-point scale, Control Beliefs Inventory, Positive and Negative Affect Scales, Wellness Behaviours Inventory.	*(+) association between self-compassion and health promoting behaviour, via lower negative affect and higher health self-efficacy (LLCI = 0.21, ULCI = 0.49),* but not via positive affect.	74%
Taylor et al., US (Bowling Green State University), 2015.	Mindful eating as a moderator of the relationship between SC and disordered eating, and SC and BMI.	*N* = 150 undergraduate college students (85% female), BMI *M* = 23.02, *SD* = 3.69, 26% overweight or obese, 74% identified as non-Hispanic White, 12% Hispanic American, 14% other ethnicity.	18-25 years (*M* =19.23 years; *SD* =1.50 years).	Quantitative, hierarchical linear regression.	Cross-sectional.	Self-report measures.	Demographics, 12 item SCS, Mindful Eating Questionnaire, Eating Attitudes Test, BMI.	**** (+) association between self-compassion and mindful eating.* *** (-) association between self-compassion and BMI.* **(-) association between self-compassion and disordered eating.* Mindful eating not a significant moderator of the association between self-compassion and disordered eating.	69%

First author, country, year of publication	Primary focus of article	Sample characteristics (*N*)	Age (years)	Methodology	Design	Data collection method	Measurement tools	Reported outcome	Quality (%)
Tylka et al., US (Ohio State University) 2015.	Family pressure to be thin as a moderator of the relationship between self-compassion and disordered eating.	*N* = 435 women from the community, from 47 US States. 73.3% identified as White, 8.7% Asian American, 8.5% African American, 4.8% Latina, 4.6% multi-racial.	18- 40 years (*M* = 28.14 years, *SD* = 5.45 years). 87.8% reported at least a year of undergraduate education.	Quantitative, two hierarchical moderated regressions, the first for thin-ideal internalisation as the outcome variable, the second for disordered eating.	Cross-sectional.	Self-report measures.	Perceived Socio-Cultural Pressures Scale, 12-item SCS, Internalisation subscale of the Socio-cultural Attitudes Towards Appearance Questionnaire-1, Eating Attitudes Test-26.	*Family pressure to be thin moderated the ***(-) association between self-compassion and disordered eating;* This relationship was non-significant when family pressure to be thin was high.	62%
Webb et al., US (North Carolina), 2013.	Indirect effect of self-compassion on binge eating severity, via emotional tolerance and un-conditional self-acceptance.	*N* = 215 female undergraduates, 45.2% European American, 23.5% Latino American, 6.9% African American, 6% Asian American, 12% South Asian American and 4.6% identified as other ethnicities.	18–28 years (*M* = 19.81 years, *SD* = 1.48 years).	Quantitative, Bootstrapping analyses using SPSS.	Cross-sectional.	Self-report measures.	26 item SCS, Emotional Tolerance Scale, Unconditional Self-Acceptance Questionnaire, Binge-Eating Scale.	*(-) association between self-compassion and binge eating severity via higher unconditional self-acceptance (LLCI = -0.19, ULCI = -0.03), and higher emotional tolerance (LLCI = -0.10, ULCI = -0.01).*	76%

Note. 26-item Self-Compassion Scale (SCS) (Neff, 2003); 12-item SCS (Raes, Pommier, Neff, & Van Gucht, 2011); Rosenberg Self-Esteem Scale (Rosenberg, 1965); Eisenberg and Neumark-Sztainer Scale for Disordered Eating (Eisenberg & Neumark-Sztainer, 2010); Objectified Body Consciousness Scale (McKinley & Hyde, 1996); Compassionate Engagement and Action Scales (Gilbert et al., 2017); Eating Disorder Examination Questionnaire (EDE-Q) (Penelo, Villarroel, Portell, & Raich, 2011); Gluten Free Diet 7-item measure (Leffler et al., 2009); Self-regulatory efficacy (Strachan & Brawley, 2008); (Jung & Brawley, 2013); Symptoms of Illness Checklist (Stowell, Hedges, Ghambaryan, Key, & Bloch, 2009); Wellness Behaviours Inventory (Fuschia M. Sirois, 2007); Bulimia Test-Revised (BULIT-R) (Thelen, Farmer, Wonderlich, & Smith, 1991); Dutch Eating Behaviour Questionnaire (DEBQ) (Van Strien, Frijters, Bergers, & Defares, 1986); Positive and Negative Affect Scales Expanded form (PANAS-X) (Watson & Clark, 1994); Control Beliefs Inventory (unpublished manual, Sirois, 2002); Mindful Eating Questionnaire (Framson et al., 2009); Eating Attitudes Test (Garner, Bohr, & Garfinkel, 1982); Sociocultural Attitudes Towards Appearance Questionnaire (Schaefer et al., 2015); Distress Tolerance Scale (Simons & Gaher, 2005); Body Image Acceptance and Action Questionnaire (Sandoz, Wilson, Merwin, & Kate Kellum, 2013); Intuitive Eating Scale (Tylka, 2006).

Table 1.3. Quality Assessment Tool for Studies with Diverse Designs (QATSDD) criteria and scoring.

Quality criteria	Breines 2014	De-Carvalho Barreto 2018	Dowd, 2017	Dunne 2016	Maraldo 2016	Schoenfeld 2013	Sirois 2014	Sirois 2015	Taylor 2015	Tylka 2015	Webb 2013
Explicit theoretical framework?	3	3	3	3	3	2	3	3	3	3	3
Statement of aims/objectives in main body of the report?	3	3	3	3	3	3	3	3	3	3	3
Clear description of research setting?	3	3	3	2	3	3	3	3	3	3	3
Evidence of sample size considered in terms of analysis?	0	0	3	0	0	0	2	1	0	0	2
Representative sample of target group of a reasonable size?	1	2	2	2	2	2	2	1	1	2	2
Description of procedure for data collection?	3	2	3	2	2	2	2	3	2	2	2
Rationale for choice of data collection tools?	2	3	3	1	2	3	3	3	3	2	3
Detailed recruitment data?	2	3	3	1	3	2	2	2	3	2	1

Quality criteria	Breines 2014	De Carvalho Barreto 2018	Dowd, 2017	Dunne 2016	Maraldo 2016	Schoenfeld 2013	Sirois 2014	Sirois 2015	Taylor 2015	Tylka 2015	Webb 2013
Statistical assessment of reliability and validity of assessment tools?	2	3	3	1	3	3	2	3	3	3	3
Fit between stated research question and method of data collection	3	2	2	2	2	2	2	2	2	2	2
Fit between research question and method of analysis?	3	3	3	3	3	3	3	3	3	2	3
Good justification for analytical method selected?	2	2	2	1	3	3	3	2	1	0	3
Evidence of user involvement in design?	0	0	0	0	0	0	0	0	0	0	0
Strengths and limitations critically discussed?	2	2	2	1	2	2	3	2	2	2	2
Total Quality Rating	69%	74%	83%	52%	74%	71%	79%	74%	69%	62%	76%

Note. 0 = not at all, 1 = Very slightly, 3 = Completely: Sirriyeh et al., (2011).

Study characteristics

Quality Assessment

Dowd and Jung (2017) scored the highest quality rating (83%) using the QATSDD (Sirriyeh et al., 2012), due to the structure of the report and amount of information provided regarding: the theoretical framework; aims and objectives; description of the research setting; sample size analysis; sample size; description of the procedure; rationale for choice of measurement tools and tests of statistical reliability and validity; justification for the analytic method and fit with the research question; and finally, a comprehensive discussion regarding strengths and limitations. Dowd and Jung (2017) also collected data over two time points to assess whether self-compassion could predict adherence to a gluten free diet one month later, increasing reliability. There were limitations, 91% of participants were female and attending support groups for people with Celiac Disease, and most participants had been diagnosed for an average of 7.85 years. This increases bias in the sample because findings may not be generalisable to people newly diagnosed or people who do not identify as female, and perhaps participants were already motivated to manage their diet more effectively due to attending a support group.

Ten out of 11 studies scored higher than 60% using the QATSDD (Sirriyeh et al., 2012) and six studies scored higher than 70%, however there is no cut-off for study quality. All studies failed to demonstrate service user involvement in the design and implementation of the study. Furthermore, all studies utilised self-report measures and cross-sectional data, which have obvious limitations, including not being able to determine causal relationships and relying on retrospective subjective reports. Several studies reimbursed participants with course credit (Breines et al., 2014; Schoenefeld & Webb, 2013) or financially (Maraldo et al., 2016; Sirois, 2015; Sirois et al., 2015; Tylka et al., 2015; Webb & Forman, 2013) increasing

bias in the sample. Only four of the 11 studies reported a sample size calculation for the analysis (see Table 1.3). Dunne et al., (2018) scored 52% on the QATSDD (Sirriyeh et al., 2012) mostly due to a lack of descriptive information in the report. See Appendix B for the results from the adapted quality assessment tool by Plassman et al., (2010).

Publication context and methodology

Table 1.2 summarises the information from each study. The 11 included studies were carried out between 2013 and 2018, emphasising the emerging nature of this field of research; however, one utilised data from 15 independent samples collected between 2007-2013 as part of a larger research programme on self-regulation and health (Sirois et al., 2015). The studies were from various countries: one was conducted in the UK (Dunne et al., 2018); one in Portugal (de Carvalho Barreto et al., 2018); six were from the US (Breines et al., 2014; Maraldo et al., 2016; Schoenefeld & Webb, 2013; Taylor et al., 2015; Tylka et al., 2015; Webb & Forman, 2013); and three from Canada (Dowd & Jung, 2017; Sirois, 2015; Sirois et al., 2015). All 11 studies used quantitative methodology and analysed cross-sectional data collected using self-report questionnaires. However, one study aimed to increase reliability and validity by incorporating longitudinal data collected over four days and included an experimental lab-based component (Breines et al., 2014). Dowd and Jung (2017) collected data at two time points, one month apart. Also, Sirois et al., (2015) utilised aggregated data from 15 independent samples collected over 6 years.

All studies examined the relationship between self-compassion and outcomes related to eating behaviour, and the influence of at least one mediating or moderating variable (see Table 1.2). Four of the studies explored the indirect relationships between self-compassion and types of disordered eating attitudes and behaviour, including restrictive eating, binging, purging, over-evaluation of weight and weight gain concern; via potential mediators, using

parallel or serial mediation. Mediators included: body shame (Breines et al., 2014); self-compassionate actions and body compassion in serial (de Carvalho Barreto et al., 2018); body dissatisfaction and negative affect as part of a larger pathway model of disordered eating (Maraldo et al., 2016); and emotional tolerance and unconditional self-acceptance in parallel (Webb & Forman, 2013). Only two studies examined potential moderators of the relationship between self-compassion and disordered eating. Taylor et al. (2015) examined mindful eating as a moderator of the negative association between self-compassion and disordered eating, and the negative association between self-compassion and Body Mass Index (BMI). Tylka et al. (2015) examined family pressure to be thin as a moderator of the negative association between self-compassion and disordered eating.

Four studies reported on the relationship between self-compassion and measures of health-related behaviour, via potential mediators. The relationship between self-compassion and adherence to a gluten free diet was examined via self-confidence in the ability to self-regulate and being able to adhere to a gluten free diet while working towards other valued goals, using parallel mediation (Dowd & Jung, 2017). The association between self-compassion and engagement in positive health behaviours was explored, via higher positive and lower negative affect, using parallel mediation (Sirois et al., 2015). A third study examined the association between self-compassion and engagement in health promoting behaviours via confidence in maintaining physical health (self-efficacy), and higher positive and lower negative affect, as parallel mediators (Sirois, 2015). Finally, a study by Schoenefeld and Webb (2013) explored the association between self-compassion and intuitive eating, via distress tolerance and body image acceptance and action, acting as serial mediators.

To summarise, most studies examined potential mediators tested in parallel or serial, and two themes emerged; one group of studies focused on the relationship between self-

compassion and disordered eating, and another group focused on the relationship between self-compassion and engagement in health promoting behaviours, including intuitive eating and eating regular healthy meals. Only two papers explored moderators of the relationship between self-compassion and disordered eating (Taylor, Daiss, & Krietsch, 2015; Tylka et al., 2015).

In terms of data analysis, three studies used hierarchical linear modelling, which can be used to address missing data (Breines et al., 2014; Taylor et al., 2015; Tylka et al., 2015); two used Analysis of Momentary Structure (AMOS) software to apply Structural Equation Modelling (de Carvalho Barreto et al., 2018; Maraldo et al., 2016) and seven applied bias-corrected bootstrapping using PROCESS (Breines et al., 2014; Dowd & Jung, 2017; Dunne et al., 2018; Schoenefeld & Webb, 2013; Sirois, 2015; Sirois et al., 2015; Webb & Forman, 2013).

Measures of self-compassion

All studies examined self-compassion as a predictor variable. Six studies utilised the 26 item Self-Compassion Scale developed by Neff (Neff, 2003), which is a validated questionnaire and aims to capture three dimensions of self-compassion: self-kindness versus self-criticism, common humanity versus isolation, and mindfulness versus over-identification. Five studies utilised the 12-item version of the Self-Compassion Scale (Raes et al., 2011); Breines et al., (2014) used both. However, Breines et al., (2014) adapted the 12-item scale to measure appearance related self-compassion and shortened it to six items (one item from each subscale). Items were reworded to reflect feelings regarding negative body-related thoughts experienced in the moment, for example *"I am obsessing and fixating on*

everything that is wrong with my body" in place of the original item *"When I'm feeling down I tend to obsess and fixate on everything that's wrong"* (Breines et al., 2014; Neff, 2003).

De Carvalho Barreto et al., (2018) utilised the Compassionate Engagement and Action Scales developed by Gilbert et al., (2017), which measure engagement and action in relation to 1) self-compassion for others; 2) compassion from others; and 3) self-compassion. The self-compassion subscale is based on Neff's construct of self-compassion (2004), however Gilbert et al., (2017) developed the scale in response to limitations identified with Neff's scale (Neff, 2003). Neff's Self-Compassion Scale has been criticised for combining positive and negative items in one scale, so that people can score highly on both, or low on both, and get the same score (Gilbert et al., 2017). The self-compassion subscale of the Compassionate Engagement and Action Scales is strongly correlated with Neff's positive dimensions of self-compassion, including mindfulness, common humanity and non-judgement (Gilbert et al., 2017). An example engagement item of the self-compassion subscale is: *"I am emotionally moved by my distressed feelings or situations"*; an action item of the self-compassion subscale is: *"I think about and come up with helpful ways to cope with my distress"* (Gilbert et al., 2017).

Measures of eating behaviour

Various measures were used for disordered eating. Breines et al., (2014) modified the 14-item Eisenberg and Neumark-Sztainer scale (Eisenberg & Neumark-Sztainer, 2010) to six items, to measure restricted eating and concern with weight gain. De Carvalho Barreto et al., (2018), and Maraldo et al., (2016), used the Eating Disorder Examination Questionnaire (EDE-Q) which is a validated 39-item questionnaire and can be used in community samples to screen for eating disorders (Fairburn & Beglin, 1994; Penelo et al., 2011). Maraldo et al.,

(2016) used the Bulimia Test-Revised (BULIT-R), (Thelen et al., 1991) which is a 36-item self-report measure used to assess symptoms of bulimia nervosa, which has been validated for both clinical and non-clinical populations.

Taylor et al., (2015) and Tylka et al., (2015), chose the validated 26-item Eating Attitudes Test (EAT) (Garner et al., 1982), which measures dieting, bulimia, food preoccupation and oral control, using three subscales. An example item is *"I have gone on eating binges where I feel I am not able to stop".* Webb and Forman (2013) used the validated 16-item Binge Eating Scale (BES) which measures behavioural manifestations and emotional or cognitive factors related to binge-eating episodes, including eating large amounts of food, and guilt or fear of the inability to stop eating (Gormally, Black, Daston, & Rardin, 1982).

Measures of health behaviour (including eating behaviour)

Various measures of physical health and health behaviour were used. Dowd and Jung (2017) measured adherence to a gluten free diet among people with Celiac Disease using the 7-item scale developed by Leffler et al., (2009), which assesses four different aspects of adherence: 1) celiac symptoms; 2) self-efficacy; 3) reasons to follow a gluten free diet; 4) perceived adherence. Participants were also asked to report the frequency of accidental and purposeful gluten ingestion over the previous week. Dunne et al., (2017) used the validated 33-item Symptoms of Illness Checklist (SIC) by Stowell et al., (2009); which asked participants to rate how often they experienced symptoms of illness over the past two-months on a 6-point scale, and the severity of the symptoms experienced. The checklist includes symptoms related to changes in appetite, including loss of appetite and overeating, however it

is unclear from the paper how many participants specifically reported these eating difficulties (Dunne et al., 2017).

Sirois et al., (2015) and Sirois (2015) utilised the validated 10-item Wellness Behaviours Inventory (Sirois & Pychyl, 2002), which assesses how often common health behaviours (e.g. healthy eating and exercise) are performed over one week, on a five-point scale. An example item is: *"I eat healthy, well-balanced meals".* Schoenefeld and Webb (2013) measured intuitive eating with the validated 21-item Intuitive Eating Scale (Tylka, 2006; Tylka & Kroon Van Diest, 2013); which captures three aspects, 1) unconditional permission to eat when hungry and what food is desired in the moment; 2) eating for physical rather than emotional reasons; 3) reliance on internal hunger and satiety cues to determine when and how much to eat (Schoenefeld & Webb, 2013).

Measures of mediator and moderator variables

A variety of questionnaires were used to measure mediator and moderator variables related to psychological distress (body shame), self-regulation of emotions or behaviour, or perceived confidence in self-regulation. The following questionnaires were used to measure psychological distress: Breines et al., (2014) used a modified version of the body shame subscale of the validated Objectified Body Consciousness Scale (OBCS) (McKinley & Hyde, 1996). Four of the eight items were included but modified to reflect body shame in the moment, for example *"Right now…I feel ashamed of my body"* replaced *"When I'm not the size I think I should be, I feel ashamed".* The scale had high internal consistency (Breines et al., 2014). Sirois et al., (2015) measured positive and negative affect as mediators using the subscales of the validated 20-item Positive and Negative Affect Schedule (PANAS) (Crawford & Henry, 2004; Watson, Clark, & Tellegen, 1988). The PANAS is standardised

for student and community samples. Maraldo et al., (2016) replicated and extended the Dual Pathway Model of Disordered Eating and explored the relationships between self-compassion and negative affect, and self-compassion and body dissatisfaction as part of a wider model predicting disordered eating. Negative affect was measured using the PANAS-X, a validated and extended version of the 20-item PANAS (Watson & Clark, 1994). Body dissatisfaction was measured using the Body Shape Questionnaire-8B (Evans & Dolan, 1993) which is an 8-item self-report measure, however two of the items were inadvertently omitted (items 25 and 28) in the study.

The remaining studies utilised measures which capture self-regulation of emotions or behaviour, or perceived confidence in self-regulation. Sirois et al., (2015) measured health self-efficacy using the eight-item health self-efficacy subscale of the Control Beliefs Inventory (CBI) (Sirois & Gick, 2002), a validated self-report questionnaire which captures an individual's confidence in carrying out actions to maintain their health. Dowd and Jung (2017) measured a participant's confidence to self-regulate their behaviour to consume a gluten free diet, using a six-item measure developed by Strachan and Brawley (2008). They also assessed confidence in adhering to a gluten free diet while managing other valued life goals, using a revised four-item measure developed by Jung and Brawley (2013). Dunne et al., (2017) measured health promoting behaviours as a mediator using the Wellbeing Behaviours Inventory (Sirois & Pychyl, 2002), also utilised by Sirois et al., (2015) and Sirois (2015). De Carvalho Barreto et al., (2018) examined the mediating effect of self-compassionate actions using the subscale from the Compassionate Engagement and Action Scales (Gilbert et al., 2017), and also body compassion using the validated 23-item Body Compassion Scale (Altman, Linfield, Salmon, & Beacham, 2017), which assesses attitudes of compassion towards one's body.

Schoenfeld and Webb (2013) measured distress tolerance as a mediator using the validated 15-item Distress Tolerance Scale (Simons & Gaher, 2005) which captures an individual's expectations and evaluations of experiencing negative emotional states in relation to: 1) tolerability and averseness; 2) appraisal and acceptability; 3) tendency to absorb attention and disrupt functioning; 4) regulation of emotions. Body image acceptance and action was measured using the validated 12-item Body-Image Acceptance and Action Questionnaire (BI-AAQ) (Ferreira, Pinto-Gouveia, & Duarte, 2011; Sandoz, Wilson, Merwin, & Kate Kellum, 2013). The questionnaire is based on the principles of Acceptance and Commitment Therapy (ACT) which facilitates acceptance of one's thoughts, feelings, and emotions toward the body, in the service of pursuing valued action (Schoenefeld & Webb, 2013).

Taylor et al., (2015) explored mindfulness as a moderator using the Mindful Eating Questionnaire (MEQ) (Framson et al., 2009), which has 28 items that assess mindful eating factors of disinhibition, awareness, external cues, emotional response and distraction. Webb and Forman (2013) used the validated 25-item Emotional Tolerance Scale derived from the Emotional Eating Scale (Arnow, Kenardy, & Agras, 1995) to measure distress tolerance as a mediator; which assesses the averseness of a range of emotions associated with overeating, including: anger or frustration, low mood and anxiety. They also explored the role of unconditional self-acceptance as a mediator using the validated 20-item Unconditional Self-Acceptance Questionnaire (Chamberlain & Haaga, 2001). Individuals scoring higher in unconditional self-acceptance tend to report more stable self-esteem and less negative reactivity in response to receiving negative feedback (Chamberlain & Haaga, 2001).

To summarise, a wide range of measures were used to explore the underlying pathways connecting self-compassion and eating behaviour. The 26-item Self-Compassion Scale (Neff, 2003) and the 12 item Self-Compassion Scale (Raes et al., 2011) were the most popular for

measuring self-compassion and were used in ten out of the 11 studies. However, a more recent study by de Carvalho Barreto et al., (2018) highlighted limitations of the Self-Compassion Scale and chose to utilise the Compassionate Engagement and Action Scales developed by Gilbert et al., (2017). The Wellness Behaviours Inventory (Sirois & Pychyl, 2002) was utilised in three studies as a measure of engagement in health promoting behaviours (Dunne et al., 2017; Sirois et al., 2015; Sirois, 2015). Disordered eating was measured using a range of questionnaires, including the EDE-Q (Fairburn & Beglin, 1994) BULIT-R (Thelen et al., 1991); EAT (Garner et al., 1982), and BES (Gormally et al., 1982). However, all measures of disordered eating highlighted a preoccupation with food, restrictive or uncontrolled eating, and the associated distress. Several studies utilised subscales from questionnaires to match their research question (see Table 1.2). Breines et al., (2014) shortened questionnaires and modified items to increase validity in relation to the research question, and to increase accessibility for participants completing questionnaires over four days. However, this may affect the validity and reliability of the measures.

Main findings: summary of the relationship between self-compassion and disordered eating

All six studies which examined the relationship between self-compassion and disordered eating reported a significant negative association, such that higher self-compassion was associated with lower disordered eating. Breines et al., (2014) reported a negative association between self-compassion and anticipated disordered eating, when controlling for self-esteem; and a significant negative association between self-compassion and weight gain concern or self-punishment, as reasons for restrained eating. De Carvalho Barreto et al., (2018) found a weak negative association between self-compassionate attributes and disordered eating.

Taylor et al., (2015) reported a significant negative association between self-compassion and disordered eating, and self-compassion and BMI. Also, Webb and Forman (2013) found a significant negative association between self-compassion and binge eating severity; and the negative correlation between self-compassion and BMI approached significance ($p = .08$).

Tylka et al., (2015), reported a significant negative association between self-compassion and disordered eating, but only when family pressure to be thin was low; when it was high, the relationship was non-significant. Maraldo et al., (2016) extended the Dual Pathway Model of Disordered Eating which describes the positive association between thin-ideal internalisation and body dissatisfaction, which contributes to disordered eating via dual pathways of rigid dietary restraint and negative affect as mediators (Stice et al., 2011). Maraldo et al., (2016) added self-compassion as a predictor in the model and reported significant negative associations between self-compassion and body dissatisfaction, and between self-compassion and negative affect. They proposed that self-compassion protects against disordered eating because of this. A significant positive association between self-compassion and dietary restraint was also reported, however the pathway was dropped because they proposed it did not make theoretical sense.

Summary of the relationship between self-compassion and physical health

The four studies exploring the relationship between self-compassion and physical health indicated a significant positive association. Sirois et al., (2015) used aggregated data from 15 unpublished independent samples and reported a significant positive association between self-compassion and the practice of positive health behaviours ($p < .001$). Sirois (2015) also highlighted a significant positive association between self-compassion and health behaviour

intentions ($p < .01$) and behaviours ($p < .01$). However, there was not a significant association between self-compassion and BMI.

Dowd and Jung (2017) found a significant positive association between self-compassion and adherence to a gluten free diet ($p = .01$) among participants with Celiac Disease. Also, the relationship between higher self-compassion and higher quality of life was significant ($p < .001$). Schoenefeld and Webb (2013), reported a significant positive association between self-compassion and intuitive eating ($p < .001$), however this became non-significant when mediators where included in the model ($p = .08$).

Mediators of the relationship between self-compassion and eating behaviour

Breines et al., (2014) reported a significant negative indirect effect of self-compassion on anticipated disordered eating and weight gain concern, via lower body shame; that is, higher self-compassion was associated with lower body shame which, in turn, was associated with lower anticipated disordered eating and concern about gaining weight. De Carvalho Barreto et al., (2018) reported a significant negative indirect effect of self-compassionate attributes on disordered eating, via higher self-compassionate actions and higher body compassion, acting in serial; that is, higher self-compassionate attributes were associated with higher self-compassionate actions, which in turn, were associated with higher body compassion, which was associated with lower levels of disordered eating. Maraldo et al., (2016) found a good model fit for higher self-compassion as a predictor of lower internalised thin idealisation, and lower body dissatisfaction and lower negative affect, as an extension of the Dual Pathway Model of Disordered Eating. Webb and Forman (2013) reported a significant negative indirect effect of self-compassion on binge eating severity via higher emotional tolerance and higher unconditional self-acceptance, acting as parallel mediators. Therefore higher self-

compassion was associated with higher emotional tolerance, and higher unconditional self-acceptance, which in turn, were both separately associated with lower binge eating severity.

Studies reported several significant mediators of the positive association between self-compassion and greater engagement in physical health behaviours. Dowd and Jung (2017) found a significant positive indirect effect of self-compassion on adherence to a gluten free diet via higher self-regulatory efficacy. Increased ability to adhere to a gluten free diet while managing other valued life goals was not a significant mediator of this relationship; however, it was a significant mediator of the positive indirect effect of self-compassion on quality of life, whereas self-regulatory efficacy was not. Dunne et al., (2017) reported a significant negative indirect effect of self-compassion on the severity of physical health difficulties via greater engagement in health promoting behaviours.

Sirois et al., (2015) findings indicated a significant positive indirect effect of self-compassion on health promoting behaviour via higher positive affect and lower negative affect, as parallel mediators. In a further study, Sirois (2015), extended the model and found a significant positive indirect relationship between self-compassion and health promoting behaviour via lower negative affect and higher health self-efficacy, but not positive affect. Additionally, Schoenefeld and Webb (2013) reported a significant positive indirect association of self-compassion on intuitive eating via higher distress tolerance and higher body image acceptance and action; however, the effect was mostly driven by higher body image acceptance and action.

Moderators of the relationship between self-compassion and eating behaviour

Taylor et al., (2015) reported that mindful eating was not a significant moderator of the negative association between self-compassion and disordered eating, or self-compassion and

BMI. However, mindful eating was significantly positively correlated with self-compassion; negatively correlated with the bulimia and food preoccupation subscale of the EAT (Garner et al., 1982) and positively correlated with the oral control subscale of the EAT. This suggests that mindful eating may facilitate a person's control over their eating. However, mindful eating was not significantly correlated with BMI. Tylka et al., (2015) found that family pressure to be thin moderated the significant negative association between self-compassion and disordered eating; when family pressure to be thin was high, the association between self-compassion and disordered eating was non-significant.

Demographic Factors

Ethnicity. Two studies did not collect participant data on ethnicity, or did not report it (Dowd & Jung, 2018; Dunne et al., 2017). De Carvalho Barreto et al., (2018) recruited women living in Portugal, however, did not provide further background information. Three studies conducted in the US reported the most diverse samples of participants in terms of race and ethnicity, including participants who identified as European-American, Asian-American, Latino-American, Hispanic-American, African-American and American Indian (Breines et al., 2014; Schoenefeld & Webb, 2013; Webb & Forman, 2013). Five studies reported less diverse samples, with over 70% of participants identifying as White/Caucasian (Maraldo et al., 2016; Sirois, 2015; Sirois et al., 2015; Taylor et al., 2015; Tylka et al., 2015).

Gender. Six studies recruited only female participants (Breines et al., 2014; de Carvalho Barreto et al., 2018; Maraldo et al., 2016; Schoenefeld & Webb, 2013; Webb & Forman, 2013); and the others recruited predominantly female participants (Dowd & Jung, 2017; Dunne et al., 2017; Sirois et al., 2014; Sirois, 2015; Taylor et al., 2015). Breines et al., (2014) provided a rationale by highlighting the increased prevalence of disordered eating among

young women (Croll, Neumark-Sztainer, Story, & Ireland, 2002; Kurth, Krahn, Nairn, & Drewnowski, 1995). Sirois et al., (2015) explored gender as a moderator of the indirect effect between self-compassion and health promoting behaviour via positive and negative affect, which was non-significant. Sirois (2015) also controlled for gender as a confounding variable and found no effect.

BMI. Three studies reported on the relationship between self-compassion and BMI. Taylor et al., (2015) reported a significant negative association between self-compassion and disordered eating, and self-compassion and BMI. Mindful eating was not a significant moderator of the relationship between self-compassion and BMI, and the relationship between mindful eating and BMI was non-significant. Furthermore, Webb and Forman (2013) found a significant negative association between self-compassion and binge eating severity; and the negative correlation between self-compassion and BMI approached significance ($p = .08$). However, Sirois et al., (2015) also reported a non-significant relationship between self-compassion and BMI, and the relationship between self-compassion and BMI was not significantly influenced by gender.

Discussion

This systematic review aimed to summarise emerging research on the relationship between self-compassion and eating behaviour; in response to a growing number of studies exploring mediators and moderators of this association. There are two previous systematic reviews on this topic, Braun, Park and Gorin (2016) summarised research on the relationship between self-compassion, body image and disordered eating in clinical and community populations. Rahimi-Ardibili et al., (2018) reviewed studies incorporating self-compassion interventions to influence eating behaviour and body weight. There are no previous

systematic reviews focused on the broader association between self-compassion and eating behaviour in a community sample; despite mounting research exploring the psychological mechanisms which underpin this relationship. This systematic review aimed to synthesise this growing evidence to highlight clinical implications for a community population and areas for further research.

Six studies reported a significant negative association between self-compassion and disordered eating. Significant mediators of this relationship included, lower body shame (Breines et al., 2014); higher self-compassionate actions and higher body compassion as serial mediators (de Carvalho Barreto et al., 2018); lower body dissatisfaction and lower negative affect (Maraldo et al., 2017); and higher unconditional self-acceptance and higher emotional tolerance as parallel mediators (Webb & Forman, 2013). In terms of moderators mindful eating was not a moderator of the significant negative association between self-compassion and disordered eating, or the significant negative association between self-compassion and BMI (Taylor et al., 2015). However, family pressure to be thin was a moderator of the significant negative association between self-compassion and disordered eating; the relationship was only significant when family pressure was low and not when family pressure was high (Tylka et al., 2015).

Furthermore, studies indicated a positive association between self-compassion and better physical health in general, including: greater adherence to a gluten free diet via increased self-confidence in the ability to self-regulate (Dowd & Jung, 2017); higher levels of intuitive eating, via higher body image acceptance and action (Schoenefeld & Webb, 2013); better physical health, via higher levels of positive emotion and lower levels of negative emotion (Sirois et al., 2015); greater engagement in health promoting behaviours via greater self-confidence in maintaining health, and lower levels of negative emotion (Sirois, 2015); and a

significant negative association between self-compassion and severity of physical health difficulties via greater engagement in health promoting behaviours (Dunne et al., 2018).

Interestingly, higher self-compassion was associated with greater adherence to a gluten free diet via increased confidence in the ability to self-regulate behaviour, but the relationship was not explained by a participant's ability to refrain from eating gluten while maintaining other valued life goals (Dowd & Jung 2018). However, people with Celiac Disease who were more self-compassionate also reported better quality of life when they were able to pursue important life goals while adhering to a gluten free diet. This suggests that other lifestyle factors might get in the way of adhering to a gluten free diet, but a flexible approach might enhance quality of life.

Overall, these findings support wider research on the potential benefits of self-compassion for psychological distress (MacBeth & Gumley, 2012; Marsh et al., 2018; Xavier et al., 2017); self-regulation of emotions and behaviour (Leary et al., 2007) negative body image (Kelly, Miller, & Stephen, 2016; Liss & Erchull, 2015) and engagement in health promoting behaviours to maintain good physical health (Terry et al., 2013).

Breines et al., (2014) incorporated a lab-based component in their study like Adams and Leary's (2007) experiment on the counter-regulation effect among dieters. Adams and Leary (2007) replicated Polivy, Heatherton, and Herman's (1988) study, and found that restrained eaters who heard a self-compassionate message while breaking their diet by eating a donut, subsequently ate less high calorie food to compensate; compared with restrained eaters who did not foster self-compassion. Adams and Leary (2007) proposed that this was because self-compassion buffered against negative emotions such as guilt and shame triggered by breaking their diet, and therefore minimised the counter-regulation effect.

Breines et al., (2014) also explored the influence of self-compassion and negative emotions on eating behaviour, like Adams and Leary's study (2007), and examined body shame as a mediator of the relationship between self-compassion and disordered eating. Breines et al., asked participants to think of a flaw in their appearance before providing chocolate and asking participants to complete questionnaires measuring body shame and disordered eating. Self-compassion did not predict the amount of chocolates eaten (which was a measure of restrained eating); however, participants who were more self-compassionate were less motivated not to eat chocolates due to concern about gaining weight or self-punishment, and this was mediated by lower body shame. This suggests that people who are more self-compassionate are motivated to self-regulate their eating behaviour for other reasons, potentially to enhance their physical health or quality of life, rather than responding to societal standards or social pressure (Terry & Leary, 2011). Tylka et al., (2015) study supports this idea; participants who reported higher self-compassion also reported less internalised social pressure to be thin, and pressure from the media and their family in particular.

Several studies explored the influence of demographic factors on the relationship between self-compassion and eating behaviour. All studies recruited either solely female participants, or a majority sample of female participants, and highlighted that disordered eating has historically disproportionately affected young women (Breines et al., 2014). However, eating related difficulties are rising among men and often undetected, and further research is required in this area to develop effective assessment tools and interventions (Strother, Lemberg, Stanford, & Turberville, 2012). In a recent review, men were more likely to be overweight or have obesity compared to women (Public Health England, 2017). Sirois et al., (2015) found that gender was not a significant moderator of the positive indirect effect between self-compassion and health promoting behaviour via higher positive and lower

negative affect. Sirois (2015) also controlled for gender as a confounding variable of the positive relationship between self-compassion and physical health; and found no effect. This suggests gender may have a weaker influence on disordered eating and engagement in health promoting behaviour than once thought. Further studies with more diverse samples in terms of age, gender, race and ethnicity are necessary to understand this better.

Two studies indicated that higher self-compassion is associated with lower BMI among a community population. Taylor et al., (2015) reported a significant negative association between self-compassion and disordered eating, and self-compassion and BMI, however the relationship between mindful eating and BMI was non-significant. Interestingly, Mantzios and Wilson (2015) compared guided meditation for mindfulness with guided meditation for self-compassion, to support weight loss among soldiers in Greece, and found self-compassion meditation was more effective for weight loss in the short and long-term. The research by Mantzios and Wilson (2015) was an intervention study and was therefore not included in the review. Furthermore, Webb and Forman (2013) found a significant negative association between self-compassion and binge eating severity; and the negative correlation between self-compassion and BMI approached significance. However, Sirois et al., (2014) reported a non-significant relationship between self-compassion and BMI. Research is required to examine this relationship further, to understand the complex relationship between self-compassion and weight. For example, low self-compassion can be associated with highly restrictive eating and eating disorders such as Anorexia Nervosa (Ferreira et al., 2013; Gale et al., 2014). Also, not everyone who has a higher weight reports lower self-compassion, psychological distress or disordered eating.

In terms of quality assessment, seven of the 11 studies scored over 70% on the QATSDD (Sirriyeh et al., 2012) mostly due to the level of description provided in relation to the theoretical framework, prospective study design, data analysis and procedure (see Table 1.3).

However, there were several limitations across studies, which all used cross-sectional designs and self-report measures. These studies cannot infer causality and overly rely on subjective recall of thoughts, emotions and behaviours. Future studies would benefit from longitudinal designs and more objective assessments, for example objective measurement of food intake.

Three studies enhanced designs to increase the reliability and validity of their findings. Breines et al., (2014) increased reliability by asking participants to complete measures of self-compassion, body image and eating behaviour over four days, to examine daily fluctuations within individual participants, as well as levels between participants. This demonstrated fluctuations in state self-compassion and also provided evidence of trait self-compassion which was stable over time. Dowd and Jung (2017) collected data at two times points, which showed that self-compassion predicted adherence to a gluten free diet one month later. Sirois et al., (2014), utilised aggregated data from 15 independent samples to conduct a meta-analysis, providing a robust account of the positive association between self-compassion and positive health behaviours.

Eight studies obtained lower quality scores for not considering sample size in their analysis, which Sanderson et al., (2007) highlighted is an important factor in determining the quality of research findings. None of the studies demonstrated service user involvement in the design and implementation of the study, which is important for increasing the reliability and validity of the research and enhancing accessibility and dissemination of findings.

This review has highlighted several clinical implications for this area of research, due to the established relationships between 1) higher self-compassion and lower levels of disordered eating; 2) higher self-compassion and greater engagement in health promoting behaviours; 3) higher self-compassion and better physical health in community populations. Emerging interventions which incorporate self-compassion for nutrition and weight loss are

promising, however further development is required (Rahimi-Ardabili et al., 2018). There is limited psycho-educational literature on self-compassion, or tools which could be used in primary care or for wider public health strategies for people experiencing eating or weight difficulties. Furthermore, Dowd and Jung's (2018) research with people living with Celiac Disease highlights the importance of self-compassion for managing specific health conditions, requiring tailored psycho-educational material and interventions.

Future research would benefit from more diverse study designs and samples of participants. All studies were cross-sectional; therefore longitudinal, experimental and qualitative methodology would enhance reliability and validity in this area of research. Most sample populations identified in this review were predominantly female participants who identified as White/European, which reduces the generalisability of the findings. Also, there is evidence that eating and weight difficulties are rising and often undetected among men, highlighting the importance of further research in this area (Strother et al., 2012). A major limitation across all studies was the lack of service-user involvement during design and implementation. All findings were published after 2012 highlighting the emerging nature of this research. Further studies using robust methodology are required to understand the complex mechanisms which help explain the relationship between self-compassion and eating behaviour.

Future research should utilise more robust methodology including longitudinal designs and objective assessment and outcome measures, to enhance the reliability and validity of findings; as well as greater diversity across participant samples, in terms of age, gender, ethnicity, race and socio-economic status, to facilitate generalisability. Furthermore, previous research has been mostly quantitative and lacked the contribution of experts by experience and service users in design and implementation. Further qualitative research is necessary to enhance the validity of findings and theory in this area.

The findings support a negative association between self-compassion and disordered eating, and a positive association between self-compassion and health promoting behaviour, which is partly explained by lower distress and greater self-regulation in terms of emotions and behaviour. Further research should explore the components of self-regulation and these complex relationships further. Terry and Leary (2011) proposed that people who are more self-compassionate may adopt a more flexible approach to their physical health, including setting more realistic and adaptable goals. Findings suggest that people who are restrained eaters who are more self-compassionate, are less motivated to regulate their eating due to pressures to be thin or self-punishment, therefore further research should explore motivational factors. Additionally, there were mixed findings in relation to the association between self-compassion and BMI, which is an interesting area for further examination.

Limitations

This systematic review narrowly focused on the association between self-compassion and eating behaviour; and specifically, research exploring moderators and mediators which may explain the psychological factors underpinning this relationship. Therefore, in comparison with Braun, Park and Gorin's (2016) review, it is limited in scope. The review did not include qualitative research or grey literature, which would have provided a richer summary of the findings in this area. Furthermore, the wider literature explores self-compassion as a moderator or mediator, and including these studies would have provided a broader examination of self-compassion as a protective factor and the pathways through which it operates.

The findings of this review were summarised in two groups, one group exploring the association between self-compassion and disordered eating; and the second group examining

the association between self-compassion and health-related behaviour. The health-related behaviour outcome measures were broad, therefore specific information in relation to diet and appetite lacked detail; however, the findings are still pertinent to this area of research. A meta-analysis was not conducted due to variation in study design and outcome measures, and concern that heterogeneity across the data could affect the results, however this could have been explored further. Finally, studies were included if they measured self-compassion using the Self-Compassion Scale (Neff, 2004), which corresponds with other systematic reviews in this area (Braun, Park & Gorin, 2016; Rahimi-Ardibili et al., 2018). However, more recent studies have explored other aspects of self-compassion; for example, utilising measures such as the Compassionate Engagement and Action Scales which include measures of compassion we experience for others and compassion we experience from others (Gilbert et al., 2017). Including research utilising other measures of compassion and comparing outcomes would provide further insight in this area.

Clinical Implications

People who are more self-compassionate appear to experience lower psychological distress, fewer eating and weight difficulties and greater engagement in health promoting behaviour; which has huge clinical implications for supporting people with psychological and physical health difficulties. Emerging evidence on the effectiveness of self-compassion interventions for eating and weight difficulties is promising, however requires further attention and development (Rahimi-Ardibili et al., 2018). Daily guided meditation to facilitate mindfulness and self-compassion supported weight loss among soldiers in Greece, and was more effective than mindfulness alone (Mantzios & Wilson, 2015). Food diaries which ask participants to reflect on “how” they are eating at meal times to foster mindfulness

and self-compassion, have also been successful for weight loss (Mantzios & Wilson, 2014). Braun, Park, and Conboy (2012) developed an intervention which included a combination of yoga, self-compassion, mindful eating, intuitive eating and fitness, which was also successful for people wanting to lose weight.

Self-compassion literature and psycho-education in primary care may improve clinical outcomes in relation to eating or weight difficulties, psychological distress, and physical health. The development of educational materials to facilitate understanding of self-compassion among community populations, and literature tailored for people managing long-term health conditions such as Celiac Disease or Diabetes is likely to be beneficial.

Conclusions

Eleven studies examined the relationship between self-compassion and eating behaviour, and the influence of one or more moderators or mediators, among participants from a community sample. Findings indicate that higher self-compassion is associated with lower levels of disordered eating; and suggest this may be explained by lower psychological distress, greater self-regulation of emotions and behaviour, greater self-acceptance, and less internalisation of social pressures related to body image. Furthermore, several studies found a positive association between self-compassion and physical health more generally, including diet and appetite. Four studies measured outcomes related to engagement in health promoting behaviours, including eating regular healthy meals, and greater adherence to a gluten free diet among people living with Celiac Disease. These relationships also appeared to be explained by lower psychological distress, and greater self-regulation of emotions and behaviour. Furthermore, findings supported a negative association between self-compassion and BMI in

a community population; however two studies did not report a significant effect, therefore further research is necessary to understand this complex relationship.

References

Adams, C. E., & Leary, M. R. (2007). Promoting Self–Compassionate Attitudes Toward Eating Among Restrictive and Guilty Eaters. *Journal of Social and Clinical Psychology*. https://doi.org/10.1521/jscp.2007.26.10.1120

Altman, J. K., Linfield, K., Salmon, P. G., & Beacham, A. O. (2017). The body compassion scale: Development and initial validation. *Journal of Health Psychology*. https://doi.org/10.1177/1359105317718924

Arnow, B., Kenardy, J., & Agras, W. S. (1995). The emotional eating scale: The development of a measure to assess coping with negative affect by eating. *International Journal of Eating Disorders*. https://doi.org/10.1002/1098-108X(199507)18:1<79::AID-EAT2260180109>3.0.CO;2-V

Barnard, L. K., & Curry, J. F. (2011). Self-Compassion: Conceptualizations, Correlates, & Interventions. *Review of General Psychology*, *15*(4), 289–303. https://doi.org/10.1037/a0025754

Booth, H. P., Prevost, T. A., Wright, A. J., & Gulliford, M. C. (2014). Effectiveness of behavioural weight loss interventions delivered in a primary care setting: A systematic review and meta-analysis. *Family Practice*. https://doi.org/10.1093/fampra/cmu064

Braun, T. D., Park, C. L., & Ann Conboy, L. (2012). Kripalu Yoga-Based Weight Loss Program. In *International Journal of Yoga Therapy*.

Braun, T. D., Park, C. L., & Conboy, L. A. (2012). Psychological well-being, health behaviors, and weight loss among participants in a residential, Kripalu yoga-based weight loss program. *International Journal of Yoga Therapy*.

Braun, T. D., Park, C. L., & Gorin, A. (2016). Self-compassion, body image, and disordered

eating: A review of the literature. *Body Image*, *17*, 117–131. https://doi.org/10.1016/j.bodyim.2016.03.003

Breines, J., Toole, A., Tu, C., & Chen, S. (2014). Self-compassion, Body Image, and Self-reported Disordered Eating. *Self and Identity*, *13*(4), 432–448. https://doi.org/10.1080/15298868.2013.838992

Breines Juliana, & Chen Serena. (2012). self compassion increases self improvement motivation. *Personality and Social Psychology Bulletin*. https://doi.org/10.1177/0146167212445599

Chamberlain, J. M., & Haaga, D. A. F. (2001). Unconditional self-acceptance and psychological health. *Journal of Rational - Emotive and Cognitive - Behavior Therapy*. https://doi.org/10.1023/A:1011189416600

Crawford, J. R., & Henry, J. D. (2004). The Positive and Negative Affect Schedule (PANAS): Construct validity, measurement properties and normative data in a large non-clinical sample. *British Journal of Clinical Psychology*. https://doi.org/10.1348/0144665031752934

Croll, J., Neumark-Sztainer, D., Story, M., & Ireland, M. (2002). Prevalence and risk and protective factors related to disordered eating behaviors among adolescents: Relationship to gender and ethnicity. *Journal of Adolescent Health*. https://doi.org/10.1016/S1054-139X(02)00368-3

Davidson, R. J., Kabat-Zinn, J., Schumacher, J., Rosenkranz, M., Muller, D., Santorelli, S. F., … Sheridan, J. F. (2003). Alterations in brain and immune function produced by mindfulness meditation. *Psychosomatic Medicine*. https://doi.org/10.1097/01.PSY.0000077505.67574.E3

Daye, C. A., Webb, J. B., & Jafari, N. (2014). Exploring self-compassion as a refuge against recalling the body-related shaming of caregiver eating messages on dimensions of objectified body consciousness in college women. *Body Image*, *11*(4), 547–556. https://doi.org/10.1016/j.bodyim.2014.08.001

de Carvalho Barreto, M., Ferreira, C., Marta-Simões, J., & Mendes, A. L. (2018). Exploring the paths between self-compassionate attributes and actions, body compassion and disordered eating. *Eating and Weight Disorders*. https://doi.org/10.1007/s40519-018-0581-3

Dowd, A. J., & Jung, M. E. (2017). Self-compassion directly and indirectly predicts dietary adherence and quality of life among adults with celiac disease. *Appetite*, *113*, 293–300. https://doi.org/10.1016/j.appet.2017.02.023

Dunne, S., Sheffield, D., & Chilcot, J. (2018). Brief report: Self-compassion, physical health and the mediating role of health-promoting behaviours. *Journal of Health Psychology*, *23*(7), 993–999. https://doi.org/10.1177/1359105316643377

Eisenberg, M. E., & Neumark-Sztainer, D. (2010). Friends' Dieting and Disordered Eating Behaviors Among Adolescents Five Years Later: Findings From Project EAT. *Journal of Adolescent Health*. https://doi.org/10.1016/j.jadohealth.2009.12.030

Evans, C., & Dolan, B. (1993). Body shape questionnaire: Derivation of shortened "alternate forms." *International Journal of Eating Disorders*. https://doi.org/10.1002/1098-108X(199304)13:3<315::AID-EAT2260130310>3.0.CO;2-3

Fairburn, C. G., & Beglin, S. J. (1994). Assessment of eating disorders: Interview or self-report questionnaire? *International Journal of Eating Disorders*. https://doi.org/10.1002/1098-108X(199412)16:4<363::AID-EAT2260160405>3.0.CO;2-#

Fairchild, A. J., & McDaniel, H. L. (2017). Best (but oft-forgotten) practices: mediation analysis. *The American Journal of Clinical Nutrition*, *105*(6), 1259-1271. doi: 10.3945/ajcn.117.152546.

Ferreira, C., Matos, M., Duarte, C., & Pinto-Gouveia, J. (2014). Shame memories and eating psychopathology: the buffering effect of self-compassion. *European Eating Disorders Review : The Journal of the Eating Disorders Association*, *22*(6), 487–494. https://doi.org/10.1002/erv.2322

Ferreira, C., Pinto-Gouveia, J., & Duarte, C. (2011). The validation of the Body Image Acceptance and Action Questionnaire: Exploring the moderator effect of acceptance on disordered eating. *International Journal of Psychology & Psychological Therapy*, *11*(3), 327–345. Retrieved from https://liverpool.idm.oclc.org/login?url=https://search.ebscohost.com/login.aspx?direct=true&db=psyh&AN=2011-23339-001&site=ehost-live&scope=site

Ferreira, C., Pinto-Gouveia, J., & Duarte, C. (2013a). Physical appearance as a measure of social ranking: The role of a new scale to understand the relationship between weight and dieting. *Clinical Psychology and Psychotherapy*. https://doi.org/10.1002/cpp.769

Ferreira, C., Pinto-Gouveia, J., & Duarte, C. (2013b). Self-compassion in the face of shame and body image dissatisfaction: Implications for eating disorders. *Eating Behaviors*. https://doi.org/10.1016/j.eatbeh.2013.01.005

Framson, C., Kristal, A. R., Schenk, J. M., Littman, A. J., Zeliadt, S., & Benitez, D. (2009). Development and Validation of the Mindful Eating Questionnaire. *Journal of the American Dietetic Association*. https://doi.org/10.1016/j.jada.2009.05.006

Garner, D. M., Bohr, Y., & Garfinkel, P. E. (1982). The Eating Attitudes Test: Psychometric Features and Clinical Correlates. *Psychological Medicine*.

https://doi.org/10.1017/S0033291700049163

Gilbert, P. (2009). Introducing compassion-focused therapy. *Advances in Psychiatric Treatment*. https://doi.org/10.1192/apt.bp.107.005264

Gilbert, P. (2010). Compassion focused therapy: Distinctive features. In *Compassion focused therapy: Distinctive features.*

Gilbert, P., Catarino, F., Duarte, C., Matos, M., Kolts, R., Stubbs, J., … Basran, J. (2017). The development of compassionate engagement and action scales for self and others. *Journal of Compassionate Health Care*. https://doi.org/10.1186/s40639-017-0033-3

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*. https://doi.org/10.1348/147608310X526511

Gormally, J., Black, S., Daston, S., & Rardin, D. (1982). The assessment of binge eating severity among obese persons. *Addictive Behaviors*. https://doi.org/10.1016/0306-4603(82)90024-7

Hayes, A. F. (2013). Introduction to Mediation, Moderation and Conditional Process Analysis. In *Journal of Chemical Information and Modeling*. https://doi.org/10.1017/CBO9781107415324.004

Hayes, A. F. (2017). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York: Guilford Publications.

Higgins, J. P. T., Altman, D. G., Gøtzsche, P. C., Jüni, P., Moher, D., Oxman, A. D., … Sterne, J. A. C. (2011). The Cochrane Collaboration's tool for assessing risk of bias in randomised trials. *BMJ (Online)*. https://doi.org/10.1136/bmj.d5928

Homan, K. J., & Sirois, F. M. (2017). Self-compassion and physical health: Exploring the

roles of perceived stress and health-promoting behaviors. *Health Psychology Open*, *4*(2). https://doi.org/10.1177/2055102917729542

Jung, M. E., & Brawley, L. R. (2013). Concurrent self-regulatory efficacy as a mediator of the goal: Exercise behaviour relationship. *Journal of Health Psychology*. https://doi.org/10.1177/1359105313479238

Kelly, A. C., Carter, J. C., Zuroff, D. C., & Borairi, S. (2013). Self-compassion and fear of self-compassion interact to predict response to eating disorders treatment: A preliminary investigation. *Psychotherapy Research*. https://doi.org/10.1080/10503307.2012.717310

Kelly, A. C., Miller, K. E., & Stephen, E. (2016). The benefits of being self-compassionate on days when interactions with body-focused others are frequent. *Body Image*, *19*, 195–203. https://doi.org/10.1016/j.bodyim.2016.10.005

Kelly, A. C., Vimalakanthan, K., & Miller, K. E. (2014). Self-compassion moderates the relationship between body mass index and both eating disorder pathology and body image flexibility. *Body Image*, *11*(4), 446–453. https://doi.org/10.1016/j.bodyim.2014.07.005

Kurth, C. L., Krahn, D. D., Nairn, K., & Drewnowski, A. (1995). The severity of dieting and bingeing behaviors in college women: Interview validation of survey data. *Journal of Psychiatric Research*. https://doi.org/10.1016/0022-3956(95)00002-M

Leary, M. R., Tate, E. B., Adams, C. E., Allen, A. B., & Hancock, J. (2007). Self-compassion and reactions to unpleasant self-relevant events: The implications of treating oneself kindly. *Journal of Personality and Social Psychology*. https://doi.org/10.1037/0022-3514.92.5.887

Leffler, D. A., Dennis, M., Edwards George, J. B., Jamma, S., Magge, S., Cook, E. F., …

Kelly, C. P. (2009). A Simple Validated Gluten-Free Diet Adherence Survey for Adults With Celiac Disease. *Clinical Gastroenterology and Hepatology*. https://doi.org/10.1016/j.cgh.2008.12.032

Liss, M., & Erchull, M. J. (2015). Not hating what you see: Self-compassion may protect against negative mental health variables connected to self-objectification in college women. *Body Image*, *14*, 5–12. https://doi.org/10.1016/j.bodyim.2015.02.006

Lutz, A., Brefczynski-Lewis, J., Johnstone, T., & Davidson, R. J. (2008). Regulation of the neural circuitry of emotion by compassion meditation: Effects of meditative expertise. *PLoS ONE*. https://doi.org/10.1371/journal.pone.0001897

MacBeth, A., & Gumley, A. (2012). Exploring compassion: A meta-analysis of the association between self-compassion and psychopathology. *Clinical Psychology Review*. https://doi.org/10.1016/j.cpr.2012.06.003

Mantzios, M., & Wilson, J. C. (2014). Making concrete construals mindful: A novel approach for developing mindfulness and self-compassion to assist weight loss. *Psychology and Health*, *29*(4), 422–441. https://doi.org/10.1080/08870446.2013.863883

Mantzios, M., & Wilson, J. C. (2015). Exploring Mindfulness and Mindfulness with Self-Compassion-Centered Interventions to Assist Weight Loss: Theoretical Considerations and Preliminary Results of a Randomized Pilot Study. *Mindfulness*, *6*(4), 824–835. https://doi.org/10.1007/s12671-014-0325-z

Maraldo, T. M., Zhou, W., Dowling, J., & Vander Wal, J. S. (2016). Replication and extension of the dual pathway model of disordered eating: The role of fear of negative evaluation, suggestibility, rumination, and self-compassion. *Eating Behaviors*, *23*, 187–194. https://doi.org/10.1016/j.eatbeh.2016.10.008

Marsh, I. C., Chan, S. W. Y., & MacBeth, A. (2018). Self-compassion and Psychological Distress in Adolescents—a Meta-analysis. *Mindfulness*. https://doi.org/10.1007/s12671-017-0850-7

McKinley, N. M., & Hyde, J. S. (1996). The objectified body consciousness scale development and validation. *Psychology of Women Quarterly*. https://doi.org/10.1111/j.1471-6402.1996.tb00467.x

Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., & The PRISMA Group. (2009). PRISMA 2009 Flow Diagram. *PLoS Medicine*. https://doi.org/10.1371/journal.pmed1000097

Neff, K. D. (2004). Self-compassion and Psychological Well-being.pdf. *Constructivism in the Human Sciences*. https://doi.org/10.1037/e633942013-240

Neff, K. D. (2003). The Development and Validation of a Scale to Measure Self-Compassion. *Self and Identity*. https://doi.org/10.1080/15298860309027

Neff, K. D., Hsieh, Y.-P., & Dejitterat, K. (2005). Self-compassion, Achievement Goals, and Coping with Academic Failure. *Self and Identity*. https://doi.org/10.1080/13576500444000317

Penelo, E., Villarroel, A. M., Portell, M., & Raich, R. M. (2011). Eating Disorder Examination Questionnaire (EDE-Q). *European Journal of Psychological Assessment*. https://doi.org/10.1027/1015-5759/a000093

Plassman, B. L., Williams, J. W., Burke, J. R., Holsinger, T., & Benjamin, S. (2010). Systematic review: Factors associated with risk for and possible prevention of cognitive decline in later life. *Annals of Internal Medicine*. https://doi.org/10.7326/0003-4819-153-3-201008030-00258

Polivy, J., Heatherton, T. F., & Herman, C. P. (1988). Self-Esteem, Restraint, and Eating

Behavior. *Journal of Abnormal Psychology*. https://doi.org/10.1037/0021-843X.97.3.354

Public Health England. (2017). Health Profile for England: 2017.

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 and Psychotherapy*. https://doi.org/10.1002/cpp.702

Rahimi-Ardabili, H., Reynolds, R., Vartanian, L. R., McLeod, L. V. D., & Zwar, N. (2018). A Systematic Review of the Efficacy of Interventions that Aim to Increase Self-Compassion on Nutrition Habits, Eating Behaviours, Body Weight and Body Image. *Mindfulness*, *9*(2), 388–400. https://doi.org/10.1007/s12671-017-0804-0

Rosenberg, M. (1965). Rosenberg Self-Esteem Scale. *Personality and Individual Differences*. https://doi.org/10.1007/s12671-015-0407-6

Sanderson, S., Tatt, I. D., & Higgins, J. P. T. (2007). Tools for assessing quality and susceptibility to bias in observational studies in epidemiology: A systematic review and annotated bibliography. *International Journal of Epidemiology*. https://doi.org/10.1093/ije/dym018

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*. https://doi.org/10.1016/j.jcbs.2013.03.002

Schaefer, L. M., Burke, N. L., Thompson, J. K., Dedrick, R. F., Heinberg, L. J., Calogero, R. M., … Swami, V. (2015). Development and validation of the sociocultural attitudes towards appearance questionnaire-4 (SATAQ-4). *Psychological Assessment*. https://doi.org/10.1037/a0037917

Schoenefeld, S. J., & Webb, J. B. (2013). Self-compassion and intuitive eating in college women: Examining the contributions of distress tolerance and body image acceptance and action. *Eating Behaviors*, *14*(4), 493–496. https://doi.org/10.1016/j.eatbeh.2013.09.001

Simons, J. S., & Gaher, R. M. (2005). The distress tolerance scale: Development and validation of a self-report measure. *Motivation and Emotion*. https://doi.org/10.1007/s11031-005-7955-3

Sirois, F. M. (2007). "I'll look after my health, later": A replication and extension of the procrastination-health model with community-dwelling adults. *Personality and Individual Differences*. https://doi.org/10.1016/j.paid.2006.11.003

Sirois, F. M. (2015). A self-regulation resource model of self-compassion and health behavior intentions in emerging adults. *Preventive Medicine Reports*, *2*, 218–222. https://doi.org/10.1016/j.pmedr.2015.03.006

Sirois, F. M., & Gick, M. L. (2002). An investigation of the health beliefs and motivations of complementary medicine clients. *Social Science and Medicine*. https://doi.org/10.1016/S0277-9536(01)00229-5

Sirois, F. M., Kitner, R., & Hirsch, J. K. (2015). Self-compassion, affect, and health-promoting behaviors. *Health Psychology : Official Journal of the Division of Health Psychology, American Psychological Association*, *34*(6), 661–669. https://doi.org/10.1037/hea0000158

Sirriyeh, R., Lawton, R., Gardner, P., & Armitage, G. (2012). Reviewing studies with diverse designs: The development and evaluation of a new tool. *Journal of Evaluation in Clinical Practice*. https://doi.org/10.1111/j.1365-2753.2011.01662.x

Stice, E., Nemeroff, C., & Shaw, H. E. (2011). Test of the Dual Pathway Model of Bulimia Nervosa: Evidence for Dietary Restraint and Affect Regulation Mechanisms. *Journal of Social and Clinical Psychology*. https://doi.org/10.1521/jscp.1996.15.3.340

Stowell, J. R., Hedges, D. W., Ghambaryan, A., Key, C., & Bloch, G. J. (2009). Validation of the Symptoms of Illness Checklist (SIC) as a tool for health psychology research. *Journal of Health Psychology*. https://doi.org/10.1177/1359105308097947

Strachan, S. M., & Brawley, L. R. (2008). Reactions to a perceived challenge to identity: A focus on exercise and healthy eating. *Journal of Health Psychology*. https://doi.org/10.1177/1359105308090930

Strother, E., Lemberg, R., Stanford, S. C., & Turberville, D. (2012). Eating Disorders in Men: Underdiagnosed, Undertreated, and Misunderstood. *Eating Disorders*. https://doi.org/10.1080/10640266.2012.715512

Taylor, M. B., Daiss, S., & Krietsch, K. (2015). Associations among self-compassion, mindful eating, eating disorder symptomatology, and body mass index in college students. *Translational Issues in Psychological Science*. https://doi.org/10.1037/tps0000035

Terry, M. L., & Leary, M. R. (2011). Self-compassion, self-regulation, and health. *Self and Identity*. https://doi.org/10.1080/15298868.2011.558404

Terry, M. L., Leary, M. R., Mehta, S., & Henderson, K. (2013). Self-Compassionate Reactions to Health Threats. *Personality and Social Psychology Bulletin*, *39*(7), 911–926. https://doi.org/10.1177/0146167213488213

Thelen, M. H., Farmer, J., Wonderlich, S., & Smith, M. (1991). A Revision of the Bulimia Test: The BULIT-R. *Psychological Assessment*. https://doi.org/10.1037/1040-

3590.3.1.119

Tylka, T. L. (2006). Development and psychometric evaluation of a measure of intuitive eating. *Journal of Counseling Psychology*. https://doi.org/10.1037/0022-0167.53.2.226

Tylka, T. L., & Kroon Van Diest, A. M. (2013). The Intuitive Eating Scale-2: Item refinement and psychometric evaluation with college women and men. *Journal of Counseling Psychology*. https://doi.org/10.1037/a0030893

Tylka, T. L., Russell, H. L., & Neal, A. A. (2015). Self-compassion as a moderator of thinness-related pressures' associations with thin-ideal internalization and disordered eating. *Eating Behaviors*, *17*, 23–26. https://doi.org/10.1016/j.eatbeh.2014.12.009

Van Strien, T., Frijters, J. E. R., Bergers, G. P. A., & Defares, P. B. (1986). The Dutch Eating Behavior Questionnaire (DEBQ) for assessment of restrained, emotional, and external eating behavior. *International Journal of Eating Disorders*. https://doi.org/10.1002/1098-108X(198602)5:2<295::AID-EAT2260050209>3.0.CO;2-T

Watson, D., & Clark, L. A. (1994). {T} {HE} {PANAS-X} Manual for the Positive and Negative Affect Schedule - Expanded Form. *Order*. https://doi.org/10.1111/j.1742-4658.2010.07754.x

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*. https://doi.org/10.1037/0022-3514.54.6.1063

Webb, J. B., & Forman, M. J. (2013). Evaluating the indirect effect of self-compassion on binge eating severity through cognitive-affective self-regulatory pathways. *Eating Behaviors*, *14*(2), 224–228. https://doi.org/10.1016/j.eatbeh.2012.12.005

Wells GA et al. (2012). The Newcastle-Ottawa Scale (NOS) for assessing the quality if nonrandomized studies in meta-analyses. *Evidence Based Public Health*. https://doi.org/10.2307/632432

Xavier, A., Pinto-Gouveia, J., Cunha, M., & Dinis, A. (2017). Longitudinal Pathways for the Maintenance of Non-Suicidal Self-Injury in Adolescence: The Pernicious Blend of Depressive Symptoms and Self-Criticism. *Child and Youth Care Forum*, *46*(6), 841–856. https://doi.org/10.1007/s10566-017-9406-1

Chapter Two: Empirical Paper

Explaining the association between self-compassion and eating behaviour; a cross-sectional study in a community sample of restrained eaters.

The Empirical Paper will be submitted to Appetite for publication, and a poster was presented at the European Congress on Obesity, 2019 (See Appendix R).

Abstract

Introduction: Self-compassion involves responding to oneself with warmth and understanding rather than self-criticism. Emerging evidence suggests a negative association between self-compassion and disordered eating; however, the mediators of this relationship are unclear. This study aimed to identify psychological mediators in a community sample of restrained eaters. Higher self-compassion is also associated with higher psychological flexibility and lower distress; therefore, the following mediators were explored: distress, flexible responses to self-critical thoughts (FoReST), flexible goals and how realistic goals are, and flexible restraint.

Methods: Eighty-eight adults from a community sample, who were highly restrained eaters (Dutch Eating Behaviour Questionnaire Restraint Scale), were included in the analyses. Questionnaires were completed using an online platform; self-compassion (Self-Compassion Scale), uncontrolled eating (Three Factor Eating Questionnaire Disinhibition Scale), distress (Depression Anxiety and Stress Scale), flexible responses to self-critical thoughts (FoReST Scale), flexible goals (Goal Adjustment Scale), how realistic goals are (5-point Likert scale), and flexible restraint (Three Factor Eating Questionnaire Rigid and Flexible Control subscales). Bootstrapping using PROCESS tested the significance of the direct relationship between self-compassion and uncontrolled eating and the indirect effects via the mediators. Age and gender were controlled for in the model.

Results: A significant indirect effect of (higher) self-compassion on (lower) uncontrolled eating via lower scores on the Rigid Control subscale (B= -.2028, standard error (SE) = .1, lower confidence interval (CI) = -.4218, upper CI = -.0353). No significant indirect effects via the other mediators.

Conclusion: Highly restrained eaters higher in self-compassion reported significantly lower levels of uncontrolled eating, and this was partly explained by less rigid control over

their eating. These findings emphasise the importance of self-compassion and flexible control in relation to dieting.

Introduction

The current working definition of self-compassion involves responding to ourselves with warmth and understanding rather than self-criticism, especially when we suffer, fail or feel inadequate; combined with mindful awareness of our emotions, rather than over-identification or avoidance (Neff, 2004). This relates to an understanding that suffering and failure is part of being human; emphasising common humanity and reducing feelings of isolation (see systematic review by Shipley, Hardman & Harrold, in submission). Emerging research on the association between self-compassion and eating behaviour suggests that higher self-compassion is associated with lower levels of disordered eating, including overly restrictive eating, uncontrolled binge eating and purging behaviour (Breines, Toole, Tu, & Chen, 2014; de Carvalho Barreto, Ferreira, Marta-Simões, & Mendes, 2018; Tylka, Russell, & Neal, 2015; Webb & Forman, 2013). This negative association has been found among people who have been diagnosed with an Eating Disorder, such as Bulimia or Anorexia Nervosa, and people from a community sample who did not meet the criteria for a diagnosis (Braun, Park, & Gorin, 2016). However, the psychological mechanisms which underpin these relationships are likely to differ between people from clinical and non-clinical populations (Kelly, Carter, Zuroff, & Borairi, 2013; Schulte, Grilo, & Gearhardt, 2016; Van Strien, Engels, Leeuwe, & Snoek, 2005).

Some evidence suggests that higher self-compassion may be associated with lower Body Mass Index (BMI) among some participants from community samples (Taylor, Daiss, & Krietsch, 2015). A systematic review of weight management interventions incorporating self-compassion, reported promising outcomes for people wanting to lose weight (Rahimi-Ardabili, Reynolds, Vartanian, McLeod, & Zwar, 2018). Furthermore, research has indicated that higher self-compassion is associated with greater engagement in health promoting

behaviours more generally, including eating regular healthy meals, eating intuitively in response to hunger and satiety (Sirois, 2015; Sirois et al., 2015; Schoenefeld & Webb, 2013), and adherence to a gluten free diet among people living with Celiac Disease (Dowd & Jung, 2017). These findings have important clinical implications for people experiencing difficulties in relation to their eating or weight and highlight the potential benefits of self-compassion.

The World Health Organisation (WHO) has emphasised the rising prevalence of people who are overweight and have obesity, especially children, and called for interventions which can tackle the complex web of biological, psychological and social influences (Public Health England, 2017; Swinburn, Caterson, Seidell, & James, 2004). Dieting to lose weight is notoriously difficult and can cause significant psychological and physical distress (Booth, Prevost, Wright, & Gulliford, 2014; Frank, 2014). Weight loss through dieting is rarely sustained long-term and this can contribute to an unhelpful relationship with food and unwanted weight gain (Dulloo & Montani, 2014); this is reflected by the projected worth of the global weight loss and weight management market, which is $278.95 billion by 2023 (Reuters, 2018). Support in primary care often focuses on behavioural interventions, including psycho-education, goal setting and problem solving; however, the effectiveness of primary care interventions is often negligible after 12 months (Booth, Prevost, Wright, & Gulliford, 2014). Therefore it is important to understand why these interventions are often unsuccessful long-term and to develop better support.

More broadly, initial findings have highlighted a positive association between self-compassion and greater engagement in health promoting behaviour, contributing to fewer physical health difficulties (Dunne et al, 2018). The positive association between self-compassion and physical health has been partly explained by lower perceived stress (the degree to which participants found their lives to be unpredictable, uncontrollable and

overwhelming) and greater engagement in health promoting behaviours, including seeking advice from health professionals, healthy eating habits and regular physical exercise (Homan & Sirois, 2017). Sirois et al. (2015) found a positive association between self-compassion and engagement in health promoting behaviours, via higher levels of positive emotion and lower levels of negative emotion; which highlights the importance of emotion regulation (Sirois et al., 2015). Sirois (2015) also reported a positive association between self-compassion and health promoting behaviour, which was partly explained by lower levels of emotional distress and greater confidence in the ability to manage health.

As discussed in the previous chapter, Terry and Leary (2011) propose that people who are more self-compassionate extend the care they would give to others, to themselves. This may result in greater self-regulation of their health, including responding to their health needs rather than avoidance, seeking help and acting on advice. Terry and Leary (2011) also suggested that greater self-awareness, self-acceptance and kindness may be associated with more attainable and flexible health goals; and goals which aim to enhance wellbeing and happiness, rather than self-worth in response to external social pressure. Neff, Hsieh and Dejitterat (2005) found that people who were more self-compassionate were more likely to set academic goals related to self-mastery, compared with goals related to performance and competition with others. An example statement of self-mastery in relation to academic achievement was “I like school work that I’ll learn from, even if I make a lot of mistakes”; an example performance goal was “I would feel really good if I were the only one who could answer the teacher’s question in class”. Neff, Hsieh and Dejitterat (2005) found that the positive association between self-compassion and self-mastery goals was partly explained by greater perceived competence and lesser fear of failure. Wrosch, Schier, Miller, Schulz and Carver (2003) further demonstrated that people who were able to disengage from unattainable goals and re-engage with new goals, reported lower stress, greater wellbeing and self-

mastery. The relationship between self-compassion and setting attainable and flexible goals in relation to eating behaviour, is a relatively new and exciting area of research.

Higher self-compassion is also associated with higher psychological flexibility (Neff & Tirch, 2013). Psychological flexibility is a central feature of Acceptance and Commitment Therapy (ACT), which encourages mindful awareness of thoughts and feelings in the present moment, while pursuing chosen values (Hayes, 2016; Hayes, Luoma, Bond, Masuda, & Lillis, 2006). Research indicates an association between psychological in-flexibility (i.e. lack of flexibility) and greater psychological distress, including: depression, anxiety, substance misuse, and psychosis (Kashdan & Rottenberg, 2010). Importantly, self-compassion protects against psychological distress, including stress, anxiety and depression (Marsh, Chan, & MacBeth, 2018; Neff, 2004). Psychological flexibility is associated with self-regulation and has clear connotations for weight management, however, there have been fewer studies in this area.

Flexible compared to rigid control over eating has been associated with greater long-term weight loss and maintenance (Sairenan, Lappalainen, Lapvetelainen, Tolvanen, and Karhunen; Teixeira et al., 2010; Westenhoefer et al., 1999). Rigid dietary restraint refers to an all or nothing approach to eating and studies have shown that rigid control over eating is associated with higher BMI (Meule, Westenhoefer, & Kubler, 2011). Meule, Westenhoefer, and Kubler (2011) found a negative association between rigid control over eating and dieting success among adults (measured by the Perceived Self-Regulatory Success in Dieting Scale; Fishbach, Friedman, & Kruglanski, 2003), and the association was partly explained by higher food cravings.

Additionally, Sairenan et al., (2014) reported a positive association between flexible control over eating and long-term weight loss among people with obesity; and psychological

wellbeing was positively associated with flexible control over eating. Also, among people with obesity engaged in an ACT intervention for weight management, higher psychological flexibility and greater skill in mindfulness were significantly associated with higher levels of intuitive eating. Psychological flexibility was characterised by the enhanced ability to continue with valued activities even when confronted with negative emotions and thoughts related to weight. Intuitive eating referred to eating in response to physical cues of hunger and satiety rather than emotional cues (Sairanen, Tolvanen, Karhunen, & Kolehmainen, 2017). These findings have implications for self-compassion research and interventions, because self-compassion is negatively associated with psychological distress (MacBeth & Gumley, 2012; Marsh et al., 2018), positively associated with psychological flexibility (Marshall & Brockman, 2016; Neff & Tirch, 2013), and negatively associated with disordered eating (Braun et al., 2016). Therefore it is possible that these variables could mediate the association between self-compassion and greater control over eating behaviour.

Previous findings exploring the negative association between self-compassion and disordered eating highlighted mediators related to the self-regulation of emotions and behaviour, including: lower body shame (Breines, Toole & Chen, 2014); higher distress tolerance and greater self-acceptance (Webb & Forman, 2013); greater body image flexibility (Schoenfeld & Webb, 2013); and greater confidence in the ability to self-regulate eating behaviour (Dowd and Jung, 2017).

Herman and Mack (1975) highlighted the association between rigid control over eating and greater uncontrolled eating in a laboratory experiment. Forty-five undergraduate students were recruited and told they were taking part in research exploring taste. The students were divided into three groups and each group assigned a different “pre-load” of milkshake; group one ate no pre-load; group two ate one chocolate milkshake (0.2 litres); group three ate two milkshakes, one vanilla and one chocolate (each 0.2 litres). Following the “pre-load” each

participant was given three tubs each containing one pint of ice cream, in three different flavours (chocolate, vanilla and strawberry); and asked to rate each flavour of ice cream on five different dimensions. Participants were given 10 minutes alone to rate the ice cream and told they could eat as much of the remaining ice cream as they wanted. Participants then completed a 38-item eating habits questionnaire, related to eating, dieting habits and weight history. While participants completed the questionnaires, the experimenter weighed the tubs of ice cream, to calculate the amount consumed in grams. Participants were then assigned to one of two groups depending on their score on the restraint scale (groups were split according to the median score on the scale of 8.5). Participants in the low restraint group consumed decreasing amounts of ice cream as a function of the size of the pre-load, and participants in the high restraint group consumed more ice-cream after the milkshake pre-load compared to no milkshake at all. Furthermore, among participants who consumed two milkshakes as a preload, there was a positive association between greater restraint and consumption of ice cream (grams).

Polivy, Heatherton & Herman (1988) further reported that consumption of alcohol, anxiety and depression, were also associated with this counter-regulation effect among people dieting, whereas they reduced eating among non-dieters. Additionally, they found that self-esteem moderated this counter-regulation effect, whereby restrained eaters who reported lower self-esteem ate significantly higher quantities of high calorie food after breaking their diet, compared to restrained eaters who were higher in self-esteem. They hypothesised that uncontrolled eating might lower self-esteem when dieting, making the person more vulnerable to uncontrolled eating in the future, and becoming a maintaining factor in their eating or weight difficulties.

Adams and Leary (2007) extended the study by Polivy, Heatherton, and Herman (1988) on the relationship between self-esteem and the counter-regulation effect among

restrained eaters, by incorporating self-compassion. They compared young people Adams and Leary compared four groups of participants; one group of highly restrained eaters and one group of non-restrained eaters heard a self-compassionate message while eating high calorie food, whereas another group of highly restrained eaters and a group of non-restrained eaters did not hear a self-compassionate message while eating high calorie food. People who were highly restrained eaters who heard a self-compassionate message, ate subsequently less high calorie food (like non-restrained eaters), when compared with participants who were highly restrained eaters who did not foster self-compassion. Adams and Leary (2007) proposed that self-compassion like self-esteem, moderated the positive association between psychological distress triggered by breaking their diet and uncontrolled eating, resulting in greater self-regulation. This further emphasises the importance of self-compassion in relation to self-regulation and eating behaviour.

To summarise, evidence suggests that people who are highly restrained eaters for the purpose of losing weight or maintaining their weight, also report greater psychological distress and uncontrolled eating (Herman & Polivy, 1988). However, self-esteem and self-compassion appear to protect against these associations, and contribute to greater self-regulation of emotions and behaviour, including less uncontrolled eating (Adams & Leary, 2007; Polivy, Heatherton, & Herman, 1988)

This study explored the associations between self-compassion and uncontrolled eating, and self-compassion and perceived self-regulatory success in dieting; among adults who identified as highly restrained eaters to lose weight or maintain their weight, from a community sample. Highly restrained eaters were recruited due to previous findings supporting the counter-regulation effect among people who were highly restrained eaters, which is not found in non-restrained eaters (Adams & Leary, 2007; Herman & Mack, 1977; Polivy, Heatherton, & Herman, 1988). Previous findings indicate a negative association

between self-compassion and uncontrolled eating, and a positive association between self-compassion and dieting success; however, mediators associated with a flexible approach to eating and weight management are yet to be explored (Braun, Park & Gorin, 2016). Higher self-compassion is associated with higher psychological flexibility and lower psychological distress, which are also associated with greater control over eating (MacBeth & Gumley, 2012; Neff & Tirch, 2013; Sairanen et al., 2017), therefore we explored potential mediators related to these constructs.

Aims and Hypotheses

This study aimed to replicate previous findings which reported a significant negative association between self-compassion and uncontrolled eating, and a positive association between self-compassion and dieting success. To further explain these relationships, the indirect effect through potential mediators related to a flexible approach to eating was explored, including: flexibility of responses to self-critical thoughts; goal flexibility (goal adjustment and how realistic goals were); flexibility of control over eating; and level of psychological distress (see Appendix D for research proposal).

Hypothesis 1: We hypothesised a significant association between higher self-compassion and lower uncontrolled eating, and higher self-compassion and greater dieting success. Lower uncontrolled eating was reflected by lower scores on the Three Factor Eating Questionnaire (TFEQ) Disinhibition Scale (Stunkard & Messick, 1985), and dieting success by higher scores on the Perceived Self-Regulatory Success in Dieting Scale (Meule, Papies & Kubler, 2012).

Hypothesis 2: We hypothesised that the significant association between higher self-compassion and lower uncontrolled eating would be mediated by a more flexible approach to

dieting, indicated by: lower distress; higher flexibility of responses to self-critical thoughts; higher goal disengagement when goals proved to be unattainable and higher goal-reengagement (goal adjustment); more realistic goals (goal expectancy); higher flexible control over eating and lower rigid control over eating. We tested this hypothesis using two parallel mediation models in succession, with uncontrolled eating as the dependent variable in model 1, followed by perceived self-regulatory success in dieting as the dependent variable in model 2. See figure 2.1 and 2.2 for more information.

Exploratory Hypothesis: Previous findings support a significant indirect relationship between higher self-compassion and lower uncontrolled eating via lower distress. We aimed to explore this relationship further by utilising a serial mediation model. This included significant mediators related to a flexible approach to dieting as the first mediator, followed by distress as the second mediator. This was exploratory and relied on mediator variables being significant in the parallel mediation model.

Method

Study overview

Adult participants aged 18 years and older were recruited online by email and social media (Facebook, Twitter and Instagram), and face to face (see Appendix E for study advert). They followed a web link to a screening questionnaire online to assess their level of restrained eating and to determine eligibility for the study (only highly restrained eaters were recruited, see participants section below for details). If the participant was eligible for the study, they were sent a web link by email to complete the full set of questionnaires (including the screening questionnaire again), and their email address was deleted to maintain anonymity. After completing the full set of questionnaires, participants were shown debrief

information and given the opportunity to enter their email into a separate prize draw, to win one of three Fitbits as reimbursement for their time.

Participants

Participants were adults (aged 18 years and older) who identified as restrained eaters to lose weight or maintain their weight, and who scored 3 or above on the Dutch Eating Behaviour Questionnaire (DEBQ) Restraint Scale (Van Strien, Frijters, Berger, & Defares, 1986) (see Appendix K for full questionnaire). The DEBQ Restraint Scale was used as a screening questionnaire to identify highly restrained eaters, because previous findings highlighted lower levels of uncontrolled eating among people who do not restrain their eating behaviour (Herman & Mack, 1975; Adams & Leary, 2007). Participants who scored 3 or above on the Restraint Scale were eligible for the study because the mean score on the Restraint Scale among the general population was 2.21 in the paper by Van Strien et al., (1986) and the standard deviation was 0.92, therefore a score of 3 or above suggests a higher level of restrained eating compared to the general population. Participants were not eligible for the study if they were accessing specialist support for their eating or weight (i.e. NHS eating disorder, weight management or bariatric services). Participants who had accessed support from their GP and were signposted to a community weight management group were eligible to take part in the study. Participants were recruited online by email and social media (Facebook, Twitter and Instagram), and face to face. Ethics approval was granted by the University of Liverpool for this research (Project ID: 2603, see Appendix E for ethical approval letter).

Measures

Screening Questionnaire: The DEBQ has three subscales measuring restrained, emotional and external eating (Cebolla, Barrada, van Strien, Oliver, & Baños, 2014; Van Strien, Frijters, Bergers, & Defares, 1986). The restraint scale was used to identify highly restrained eaters, higher scores indicate higher cognitive restraint, and those who scored three or above were eligible for the study (see Appendix K). An example item is *"How often do you refuse food or drink offered because you are concerned about your weight"?* The scale shows good reliability in clinical and non-clinical populations (Van Strien et al., 1986) The Cronbach's Alpha for the restraint scale in this study was 0.65.

Self-compassion (Independent Variable): The Self-Compassion Scale was developed by Neff (2003) and has six subscales: self-kindness, self-judgement, common humanity, isolation, mindfulness and over-identification. Scores from each subscale can be used, or a total score for self-compassion, which is the grand mean of the subscale means (see Appendix J for questionnaire). The total score was used in this study. An example item is *"I am disapproving and judgemental about my own flaws and inadequacies"*. The Self-Compassion Scale shows good validity and reliability, it has been used extensively to develop research in this area (Neff, 2003; 2016; 2019). The Cronbach's Alpha for the Self-Compassion Scale in this study was 0.95.

Uncontrolled eating (Dependent Variable 1): The Three Factor Eating Questionnaire (TFEQ) Disinhibition subscale (see Appendix Q). The TFEQ is a 51-item scale with three subscales measuring: cognitive restraint of eating, disinhibition and hunger (Stunkard & Messick, 1985). An example item from the Disinhibition subscale is *"sometimes when I start eating, I just can't seem to stop"*. The scale shows good validity and reliability and has been used widely in this field of research (Bond, McDowell, & Wilkinson, 2001; Karlsson,

Persson, Sjöström, & Sullivan, 2000; Yeomans, Leitch, & Mobini, 2008). The Cronbach's Alpha for the TFEQ Disinhibition subscale in this study was 0.73.

Perceived self-regulatory success in dieting (Dependent Variable 2): The Perceived Self-Regulatory Success in Dieting Scale is a three-item scale which can be used to differentiate between successful and unsuccessful dieters (Meule, Papies & Kubler, 2012) (see Appendix O). An example item is *"How successful are you at watching your weight"?* Internal consistency is reasonably high, and the scale is negatively correlated with BMI, concern for dieting, rigid dietary control and binge eating (Fishbach, Friedman, & Kruglanski, 2003; Meule, Papies, & Kübler, 2012). The Cronbach's Alpha for the Perceived Self-Regulatory Success in Dieting Scale in this study was 0.64.

Flexibility of responses to self-critical thoughts (FoReST), (Mediator): The 12 item FoReST Scale measures the ability to act in a flexible way which is congruent with one's values, in the presence of self-critical thoughts (Larkin, 2014) (see Appendix M). An example item is *"When I have a critical thought about myself it makes me lose control of my behaviour".* The scale is relatively new, however shows good internal consistency and good concurrent and predictive validity (Larkin, 2014). Higher scores indicate higher psychological in-flexibility (i.e. less flexibility of responses to self-critical thoughts). The Cronbach's Alpha for the FoReST Scale in this study was 0.82.

Goal flexibility (Mediator): The Goal Adjustment Scale measures how easily someone can disengage from an unattainable goal and re-engage with a new one (Wrosch et al., 2013) (see Appendix L). An example goal disengagement item is *"If I have to stop pursuing an important goal in my life, I stay committed to the goal for a long time; I can't let it go";* An example goal re-engagement item is *"If I have to stop pursuing an important goal in my life, I convince myself I have other meaningful goals to pursue"*. Higher scores on each subscale

reflect easier disengagement and re-engagement, respectively. The subscales are not highly correlated (Wrosch et al., 2013; Wrosch, Miller, Scheier, & De Pontet, 2007; Wrosch, Scheier, & Miller, 2013). The Cronbach's Alpha for the Goal Adjustment Scale in this study was 0.84.

Goal expectancy (Mediator): Participants were asked to generate a personal goal related to their restrained eating and rate the likelihood they would achieve that goal on a 1-5 Likert Scale, e.g. *"I want to lose 10kg"* or *"I want to look and feel good in my clothes".* A higher score indicates a more realistic and attainable goal.

Flexibility of restraint (Mediator): Westenhoefer, Stunkard, and Pudel (1999) identified and validated two subscales concerning flexible and rigid control over eating, from the cognitive restraint subscale of the TFEQ (Stunkard & Messick, 1985) (see Appendix P). An example item for flexible control is *"If I eat a little bit more on one day, I make up for it the next day";* an example item for rigid control is *"I have a pretty good idea of the number of calories in common foods".* There is a significant positive association between higher rigid cognitive restraint and higher uncontrolled eating, whereas higher flexible restraint is associated with lower levels of uncontrolled eating; the subscales show good validity and reliability (Westenhoefer, Stunkard, & Pudel, 1999). The Cronbach's Alpha for the flexible control over eating subscale in this study was 0.54, and for the rigid control over eating subscale 0.59.

Distress (Mediator): The Depression Anxiety and Stress Scale - 21 (DASS – 21) is a 21-item scale which can be used as a general measure of psychological distress or as separate scales for depression, anxiety or stress (Henry & Crawford, 2005) (see Appendix N). An example item for depression is *"I couldn't seem to experience any positive feeling at all".* The scale has been normed for a non-clinical, general adult population, and exhibits good

reliability (Henry & Crawford, 2005; Lovibond & Lovibond, 1995; Lovibond, & Lovibond, 1995). The Cronbach's Alpha for the DASS – 21 in this study was 0.91.

Procedure

Participants accessed the questionnaires by following a link to the online platform Qualtrics, which was advertised online via the university psychology department and university announcement system, and on social media (Facebook, Twitter and Instagram). Participants attending community weight management groups were also recruited, however this happened informally through word of mouth. Weight Watchers and Slimming World were contacted for permission to formally recruit participants attending their groups, however they declined. Participants were asked to read the participant information sheet and provide informed consent before completing the screening questionnaire (see Appendices G and H for forms). Those who scored 3 or above on the DEBQ restraint scale (Van Strien, Frijters, Berger & Defares, 1986) which indicated highly restrained eating and therefore eligibility for the study, were subsequently contacted by email with a link to the full set of questionnaires. All email addresses were deleted at this stage to ensure anonymity.

Participants accessing the full set of questionnaires were asked to read the information sheet again and provide informed consent, before completing demographic data including their gender, age, weight and height. The questionnaires measuring each variable were then presented in a random order. Once completed, participants were informed of the variables being studied and signposted for further support via their GP for mental health or eating related difficulties if necessary (see Appendix I for debrief information). Finally, participants were given the opportunity to enter their email into a separate prize draw, to win one of three Fitbits as reimbursement for their time. This information was separate from their other data to maintain anonymity. Participants were given the lead researcher's email address and phone

number if they had a question about the research. They were told they could withdraw from the study at any time, before submitting the full set of questionnaires.

Data analysis

Figure 2.1 is a flow diagram which shows the participant recruitment process from screening to the participant data included in the analysis (including non-eligible participants and drop-outs). Data from 88 participants was included in the analysis.

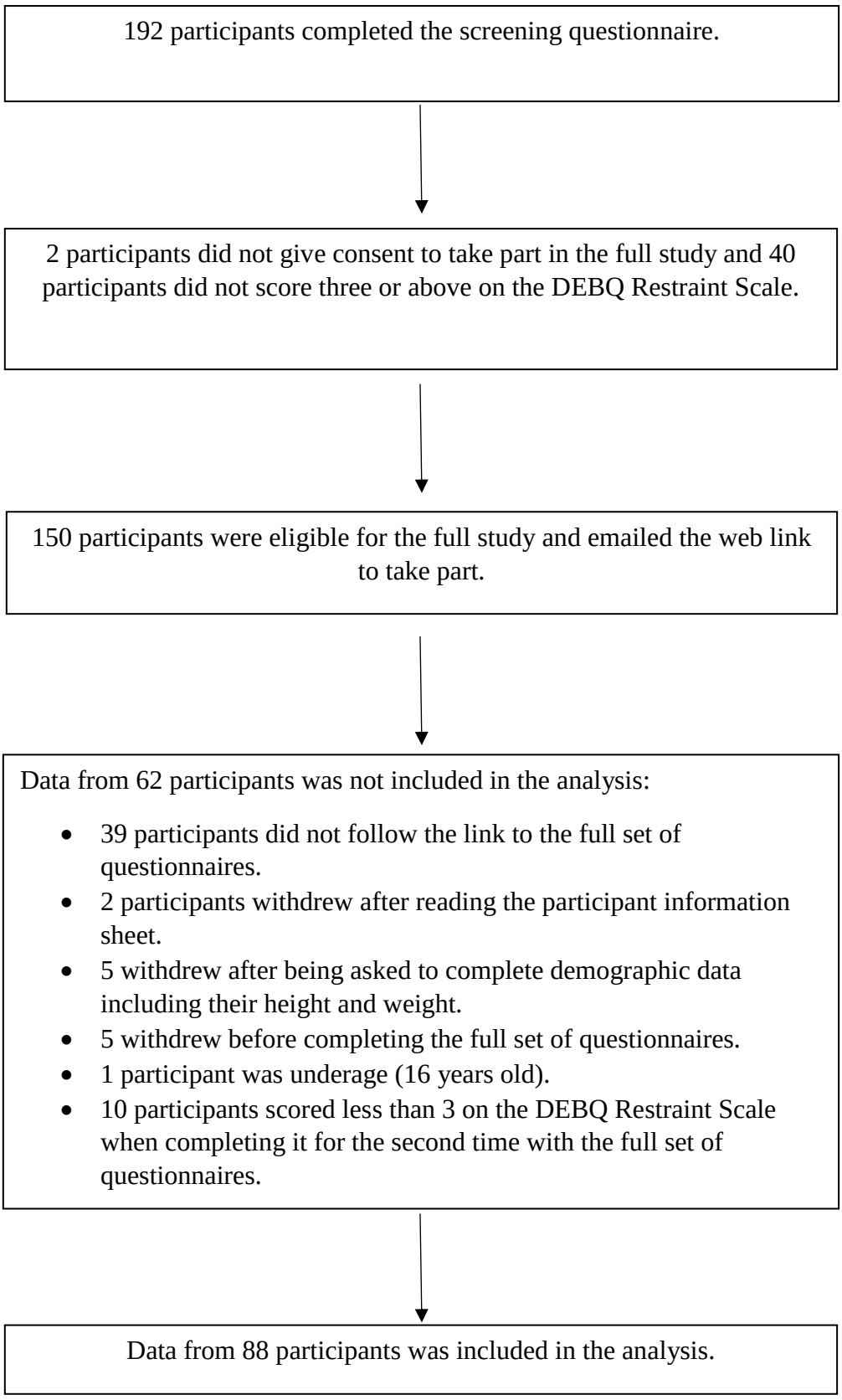


Figure 2.1. Flow diagram of recruitment process from screening to data included in analysis.

Fritz and MacKinnon (2007) reported that a sample size of 71 participants is required to detect a mediated effect at 80% statistical power using bias-corrected bootstrapping, when the size of the path of the independent variable on the mediator (X on M) is 0.39, and the path between the mediator and the dependent variable when controlling for X on M is 0.39. Therefore, a sample size of 88 is reasonably powered. To measure the relative contributions of the potential mediators of the relationship between self-compassion and uncontrolled eating, and the relationship between self-compassion and dieting success, we ran two parallel multiple mediation models in succession, using PROCESS Macro v3.3 in SPSS (Hayes, 2018). This method of analysis was chosen because it allows for the simultaneous entry of multiple mediators within a single model and shows the independent contribution of each mediator, as part of the indirect pathway from the predictor variable (self-compassion) to the outcome variable (uncontrolled eating and dieting success, respectively). A significant indirect pathway is indicated when the Lower Level Confidence Interval (LLCI) and the Upper Level Confidence Interval (ULCC) do not cross zero (Hayes, 2018).

The first parallel multiple mediator model was run with self-compassion as the predictor variable, uncontrolled eating (i.e. TFEQ Disinhibition) as the outcome variable, and variables associated with a flexible approach to eating as potential mediators: 1) flexibility of responses to self-critical thoughts; 2) goal disengagement; 3) goal re-engagement (goal adjustment); 4) goal expectancy (how realistic goals were); 5) rigid control over eating; 6) flexible control over eating (goal flexibility); 7) psychological distress. The second parallel multiple mediator model was run with self-compassion as the predictor variable, perceived dieting success as the outcome variable, and the same variables entered as potential mediators. The data was log transformed prior to running the analysis, and age and gender were controlled for in both models. In all models, the covariates were controlled for at the level of both the mediator and

the outcome. All models ran 5000 bootstrap samples and 95% confidence intervals are reported.

Results

Demographic information

Eighty-eight participants were included in the analysis, 8 participants identified as male, 79 female, and 1 non-binary, mean age = 38 years (standard deviation = 14.89 years, minimum = 20 years, maximum = 74 years). According to WHO weight classification, 2.3% of participants were underweight, 55.7% were normal weight, 31.8% were overweight and 10.2% had obesity. 14 participants attended a weight management group (15.9%). See table 2.1 for more demographic data.

Table 2.1.

Demographic Data According to Participant Group

Participant Group	Number	Mean BMI (kg/ m^2)	Mean Self-Compassion Score	Mean Uncontrolled Eating Score
Full sample	88	25.01 (4.02)	2.99 (0.58)	8.25 (3.33)
Male	8	27.84 (4.37)	3.19 (0.61)	7.13 (3.18)
Female	79	24.70 (3.92)	2.95 (0.57)	8.43 (3.31)
Attending weight management group	14	25.93 (3.35)	2.77 (0.78)	10 (2.45)
Not attending weight management group	74	24.83 (4.13	3.03 (0.53)	7.92 (3.39)
Underweight	2	18.1 (0.42)	2.87 (0.45)	4 (2.83)
Normal weight	49	22.63 (1.79)	2.99 (0.56)	7.79 (3.29)
Overweight	28	26.8 (1.35)	2.99 (0.65)	9.07 (3.19)
Obesity	9	33.88 (2.03)	3 (0.58)	9.11 (3.37)

Note. Mean scores and standard deviations in parentheses for BMI, self-compassion and uncontrolled eating according to participant group.

Table 2.1 shows demographic data for BMI, self-compassion and uncontrolled eating according to each participant group when differentiated by gender, attendance at a weight management group, and BMI categories according to the WHO.

Table 2.2. Cohort level means and standard deviations for each measure.

Cohort Level Means and Standard Deviations for Each Measure.

Variable	Mean Score	Standard Deviation
Self-Compassion	2.99	0.58
Disinhibition	8.25	3.33
Self-Regulatory Success	12.88	2.81
Distress	35.65	8.99
FoReST	38.39	9.51
Goal Disengagement	10.52	3.07
Goal Re-engagement	21.56	4.47
Goal Expectancy	3.9	0.92
Flexible Control	8.67	2.14
Rigid Control	10.78	2.98

Table 2.2 shows the cohort level means and standard deviations for each measured variable.

Table 2.3.

Correlations Between Measures.

		1	2	3	4	5	6	7	8	9	10
1	Self-Compassion	-									
2	Un-controlled eating	-.32***									
3	Dieting Success	.12	-.26*								
4	Distress	-.50***	.42***	-.36***							
5	FoReST	-.44***	.36***	-.38***	.42***						
6	Goal Expectancy	.18	-.32***	.46***	-.26*	-.37***					
7	Goal Dis-engagement	.16	-.03	-.09	.01	.08	-.08				
8	Goal Re-engagement	.28***	-.25*	.132	-.23*	.20	.20	.24*			
9	Flexible Control	-.01	-.17	.29**	.00	.06	.12	-.19	-.03		
10	Rigid Control	-.29***	.46***	-.19	.29***	.44***	-.28***	-.11	-.39***	.11	
11	BMI	.001	.24*	-.27***	.17	.02	-.16	.22*	.08	-.45***	.12

*Note. * = correlation is significant at p<.05 level, ** = correlation is significant at p<0.01 level, *** = correlation is significant after Bonferroni Correction at p<0.005.*

Table 2.3 shows the correlations between the measured variables. To reduce the likelihood of a Type 1 Error (a false significant result) due to the number of multiple comparisons being carried out, the Bonferroni Correction was calculated. This analysis made

11 multiple comparisons, therefore if divided by the significance value $p = 0.05$, the Bonferroni Corrected value is $p = 0.005$. Self-compassion was significantly positively correlated with goal re-engagement after previous goals were unsuccessful, and significantly negatively correlated with uncontrolled eating, psychological distress, in-flexibility in response to self-critical thinking (lower scores demonstrate greater flexibility), and rigid control over eating. Self-compassion was not significantly correlated with BMI, dieting success, setting realistic goals, disengaging from unattainable goals, and flexible control over eating. Psychological distress was significantly positively correlated with uncontrolled eating. Rigid control over eating was significantly positively correlated with uncontrolled eating and distress, and significantly negatively correlated with setting realistic goals and goal re-engagement when previous goals have been unsuccessful. Whereas flexible control over eating was significantly positively correlated with perceived dieting success but was not significantly correlated with uncontrolled eating. In-flexibility in response to self-critical thoughts was positively correlated with rigid control over eating, uncontrolled eating, distress and dieting success.

Hypothesis One: Is higher self-compassion associated with lower uncontrolled eating and greater dieting success, respectively?

There was a significant association between higher self-compassion and lower uncontrolled eating using Pearson Correlation ($r = -0.32$, $n = 88$, $p = .002$). However, the association between self-compassion and dieting success was not significant ($r = 0.12$, $n = 88$, $p = 0.29$).

Hypothesis Two (parallel multiple mediation model 1): Does a flexible approach to eating mediate the relationship between self-compassion and uncontrolled eating?

The parallel multiple mediation model showed that the total effect of self-compassion on uncontrolled eating was significant (*B* = -0.72, *SE* = 0.26, *p* = .01). However, the direct effect of self-compassion on uncontrolled eating was not significant when the mediators were included in the model (*B* = -0.19, *SE* = 0.29), *p* = .51). There was a significant indirect relationship between self-compassion and uncontrolled eating via the Rigid Control subscale of the TFEQ, *B* = -0.2, (*SE* = 0.1), *LLCI* = -0.43, *ULCI* = -0.04. This indicates that higher self-compassion was associated with less rigid control over eating, which in turn, was associated with less uncontrolled eating. There were no significant indirect effects via any of the other mediators. Other details of the model can be found in Figure 2.2.

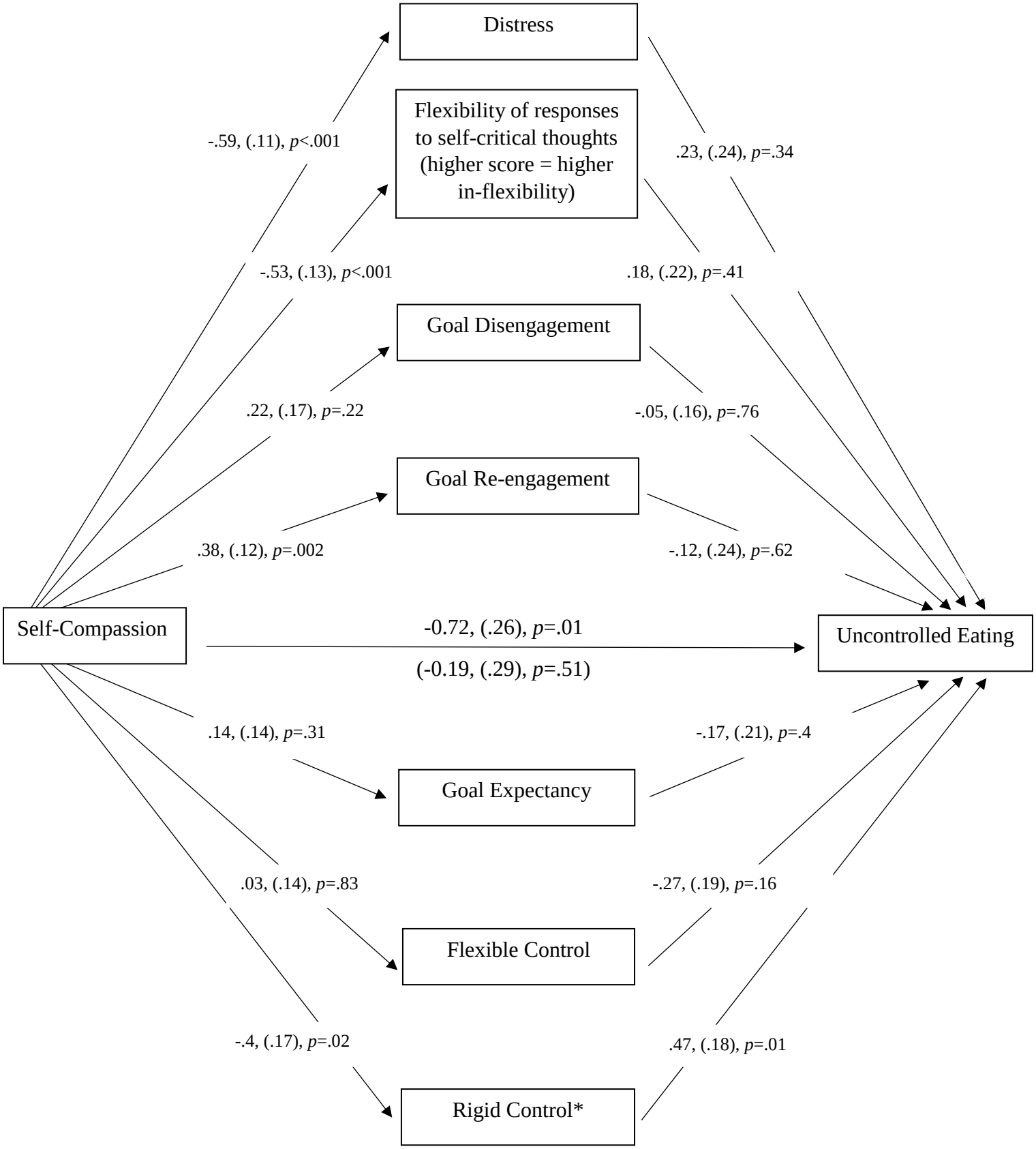

Distress
Flexibility of responses to self-critical thoughts (higher score = higher in-flexibility)
Goal Disengagement
Goal Re-engagement
Goal Expectancy
Flexible Control
Rigid Control*
Self-Compassion
Uncontrolled Eating
-.59, (.11), p<.001
.23, (.24), p=.34
-.53, (.13), p<.001
.18, (.22), p=.41
.22, (.17), p=.22
-.05, (.16), p=.76
.38, (.12), p=.002
-.12, (.24), p=.62
-0.72, (.26), p=.01
(-0.19, (.29), p=.51)
.14, (.14), p=.31
-.17, (.21), p=.4
.03, (.14), p=.83
-.27, (.19), p=.16
-.4, (.17), p=.02
.47, (.18), p=.01

Figure 2.2.

Figure 2.2. Regression coefficients are shown with standard error in brackets, B(SE). Value in parentheses is the direct effect when controlling for indirect effects. Significant indirect relationships between self-compassion and uncontrolled eating are identified by an asterisk, and were found via Rigid Control (*B* = -0.2, (*SE* = 0.1), *LLCI* = -0.43, *ULCI* = -0.04), but for no other variables; Distress (*B* = -0.16, (*SE* = 0.16), *LLCI* = -0.56, *ULCI* = 0.07); FoReST (*B* = -.0.09, (*SE* = 0.14), *LLCI* = -0.35, *ULCI* = 0.2); Goal Disengagement (*B* = -0.01, (*SE* = 0.06), *LLCI* = -0.17, *ULCI* = 0.06); Goal Re-engagement (*B* = -0.03, (*SE* = 0.08), *LLCI* = -0.21 , *ULCI* = 0.12); Goal Expectancy (*B* = -0.03, (*SE* = 0.06), *LLCI* = -0.17, *ULCI* = 0.06); Flexible Control (*B* = -0.01, (*SE* = 0.06), *LLCI* = -0.13, *ULCI* = 0.12). The overall R-sq for the model was 0.3371.

Hypothesis Two (parallel multiple mediation model 2): Does a flexible approach to eating mediate the relationship between self-compassion and perceived dieting success?

The parallel multiple mediation model showed that the total effect of self-compassion on dieting success was not significant (i.e. when no mediators were included in the model) (*B* = 0.15, *SE* = 0.15, *p* = .35). Also, the direct effect of self-compassion on dieting success when controlling for the mediators was not significant (*B* = -0.25, *SE* = 0.16, *p* = .12). However, there was a significant indirect relationship between self-compassion and dieting success via the FoReST Scale, *B* = 0.15, (*SE* = 0.06), *LLCI* = 0.04, *ULCI* = 0.29. Specifically, higher self-compassion was associated with lower in-flexibility of responses to self-critical thoughts, which in turn was associated with higher perceived self-regulatory success in dieting. There were no significant indirect effects via any of the other mediators. Other details of the model can be found in Figure 2.3.

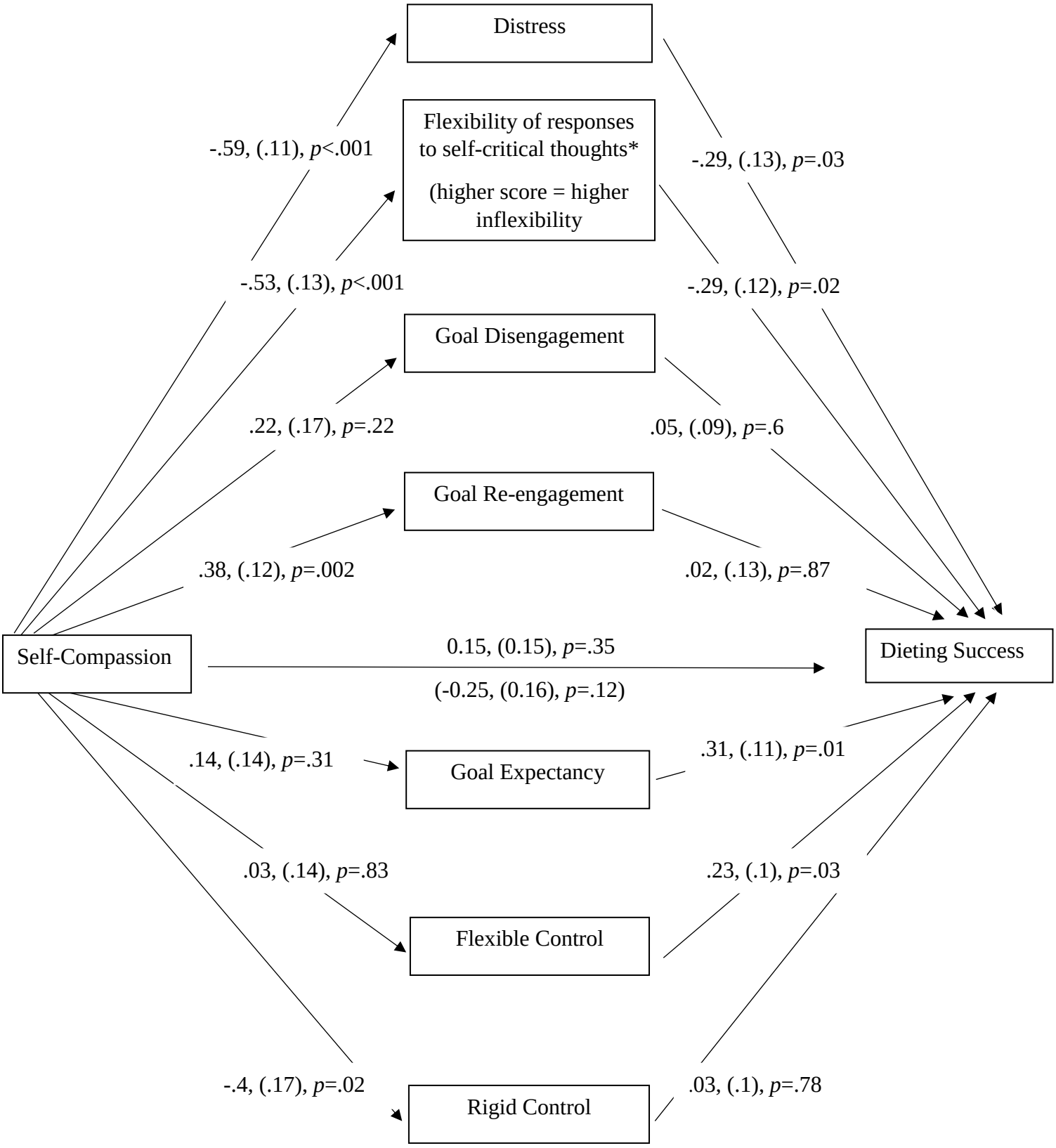

Distress
Flexibility of responses to self-critical thoughts*
(higher score = higher inflexibility
Goal Disengagement
Goal Re-engagement
Goal Expectancy
Flexible Control
Rigid Control
Self-Compassion
Dieting Success
-.59, (.11), p<.001
-.29, (.13), p=.03
-.53, (.13), p<.001
-.29, (.12), p=.02
.22, (.17), p=.22
.05, (.09), p=.6
.38, (.12), p=.002
.02, (.13), p=.87
0.15, (0.15), p=.35
(-0.25, (0.16), p=.12)
.14, (.14), p=.31
.31, (.11), p=.01
.03, (.14), p=.83
.23, (.1), p=.03
-.4, (.17), p=.02
.03, (.1), p=.78

Figure 2.3.

Figure 2.3. Regression coefficients are shown with standard error in brackets, B(SE). Value in brackets is the direct effect when controlling for indirect effects. Significant indirect relationships between self-compassion and dieting success are identified by an asterisk, and were found via FoReST (*B* = 0.15, (*SE* = 0.06), *LLCI* = 0.04, *ULCI* = 0.3), but for no other mediators; Distress (*B* = 0.18, (*SE* = 0.13), *LLCI* = -.02, *ULCI* = 0.48); Goal Disengagement (*B* = 0.01, (*SE* = 0.03), *LLCI* = -.05 , *ULCI* = 0.08); Goal Re-engagement (*B* = 0.001, (*SE* = 0.06), *LLCI* = -0.1, *ULCI* = 0.14); Goal Expectancy (*B* = 0.05 , (*SE* = 0.07), *LLCI* = -0.05 , *ULCI* = 0.22); Flexible Control (*B* = 0.01, (*SE* = 0.04), *LLCI* = -0.07, *ULCI* = 0.12); Rigid Control (*B* = -0.003, (*SE* = 0.03), *LLCI* = -0.07, *ULCI* = 0.06). The overall R-sq for the model was 0.3879.

Exploratory Analyses

Distress was not a significant mediator of the relationship between higher self-compassion and lower uncontrolled eating. Therefore, we did not include it in the serial mediation model as originally planned (i.e. see page 82), and did not include any exploratory analyses including this variable.

However, lower rigid control over eating was a significant mediator of the relationship. To explore whether the significant negative association between higher self-compassion and lower uncontrolled eating via lower rigid control over eating was also associated with lower BMI, a serial mediation model was run using PROCESS Macro v3.3 Model 6 (Hayes, 2018). In the serial mediation model, self-compassion was the independent variable; BMI was the dependent variable; rigid control over eating was the first mediator; and uncontrolled eating was the second mediator.

The total effect of self-compassion on BMI was not significant (p = .89). Also, the direct effect of self-compassion on BMI was not significant (p =.53). However, there was a significant simple indirect relationship between higher self-compassion and lower BMI via lower uncontrolled eating, (B = -2.17, (SE = 1.36), $LLCI$ = -5.39, $ULCI$ = -0.02). Also, there was a significant serial indirect relationship between higher self-compassion and lower BMI, via less rigid control over eating (mediator 1) and less uncontrolled eating (mediator 2), (B = -1.14, (SE = 0.7), $LLCI$ = -2.76, $ULCI$ = -0.08). Other details of the model can be found in Figure 2.4.

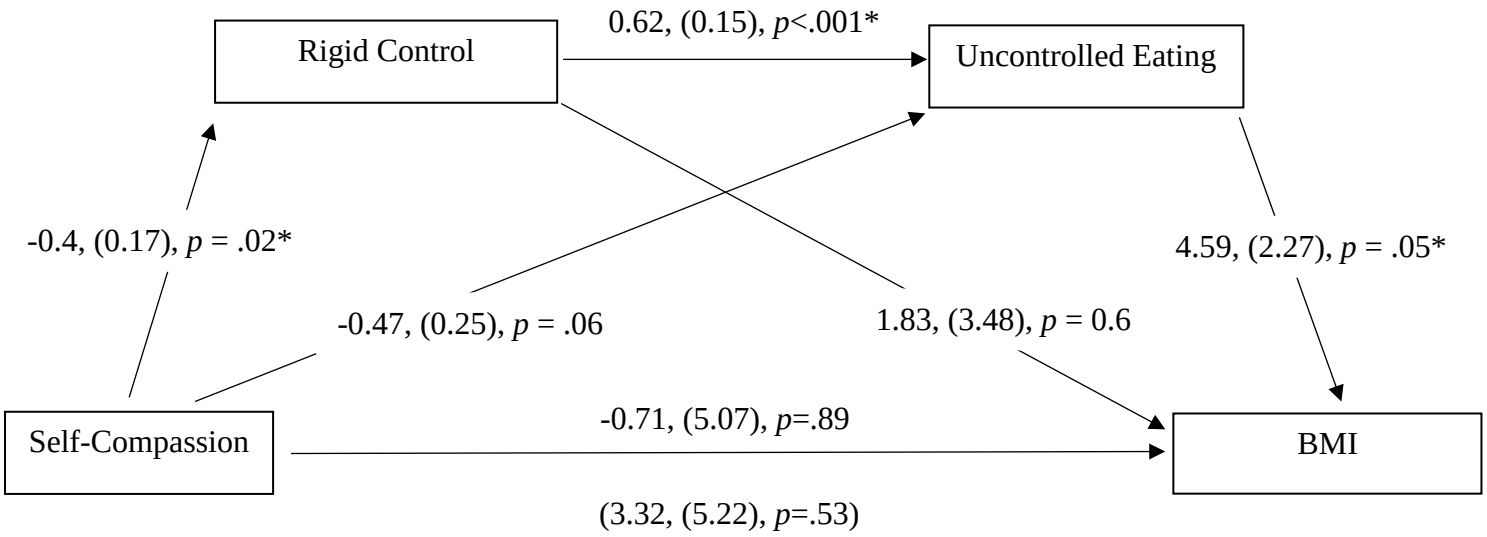


Figure 2.4. Exploratory model.

Figure 2.4. Regression coefficients are shown with standard error in brackets, B(SE). Value in brackets is the direct effect when controlling for the mediators. Significant pathways are identified by an asterisk.

However, further analysis revealed that when controlling for attendance at a weight management group, the indirect relationship between higher self-compassion and lower BMI,

via lower rigid control over eating and lower uncontrolled eating became non-significant (*B* = -.14, (*SE* = 0.1), *LLCI* = -.39, *ULCI* = .00). People attending a weight management group scored significantly higher on uncontrolled eating (M = 10.00, SD = 2.45) compared to those who were not (M = 7.92, SD = 3.39); t(86) = 2.19, p = 0.03).

Discussion

The overarching aim of this research was to examine the mechanisms underpinning the relationship between self-compassion and uncontrolled eating within a community sample of highly restrained eaters. Hypothesis One was partially supported, there was a significant negative association between higher self-compassion and lower uncontrolled eating (*r* = -0.32, *n* = 88, *p* = .002). However, the association between self-compassion and perceived dieting success was not significant (*r* = 0.12, *n* = 88, *p* = 0.29). Hypothesis Two was partially supported, there was a significant total effect between self-compassion and uncontrolled eating (*B* = -0.72, *SE* = 0.26, *p* = .01); and the direct effect of self-compassion on uncontrolled eating was not significant when mediators relating to a flexible approach to dieting were included in the model (*B* = -0.19, *SE* = 0.29), *p* = .51). Furthermore, higher self-compassion was associated with less rigid control over eating, which in turn, was associated with less uncontrolled eating (*B* = -0.2, (*SE* = 0.1), *LLCI* = -0.45, *ULCI* = -0.04). However, there were no significant indirect effects via any of the other mediators. The total and direct effect of self-compassion on perceived dieting success were not significant, which does not support Hypothesis Two; however, higher self-compassion was associated with lower in-flexibility of self-critical thoughts, which in turn, was associated with greater perceived dieting success.

The Exploratory Hypothesis aimed to examine the association between self-compassion and uncontrolled eating via distress as a mediator; because previous findings indicate that higher self-compassion is associated with lower distress, which is in turn associated with lower levels of uncontrolled eating (Braun, Park, & Gorin, 2016). Additionally, if this exploratory hypothesis was supported, serial mediation would be used to examine whether self-compassion is associated with a flexible approach to dieting, which in turn is associated with lower distress, which in turn is associated with less uncontrolled eating. This could provide insight into potential psychological mechanisms which explain the association between self-compassion and uncontrolled eating. Distress was not a significant mediator of the association between higher self-compassion and lower uncontrolled eating, and therefore this hypothesis was not explored.

However, lower rigid control was a significant mediator of the association between higher self-compassion and uncontrolled eating; and because of the pertinence of this association for the recruited population (highly restrained eaters for the purpose of losing weight or maintaining their weight), the hypothesis that this indirect effect would be associated with lower BMI was explored. This exploratory hypothesis was supported; Higher self-compassion was associated with lower rigid control over eating, which was in turn associated with lower uncontrolled eating, which in turn was associated with lower BMI. Indicating that restrained eaters who reported higher self-compassion, who also adopted a less rigid approach to dieting, in turn reported less uncontrolled eating, which was associated with lower reported BMI.

The findings support Herman and Mack's (1975) counter-regulation model of dietary restraint, which theorised that restrained eaters who exercise rigid control over their diet eat more when they break their dietary rules by eating food perceived as high calorie, compared with non-restrained eaters or restrained eaters who adopt a more flexible approach. The

findings also support Polivy et al., (1988), and Adams and Leary (2007), who reported that self-esteem and self-compassion minimise counter-regulation; potentially because people who are more self-compassionate adopt more flexible control over their eating, and are more able to tolerate emotional distress associated with breaking their diet.

Psychological flexibility in response to self-critical thinking was a mediator of the relationship between self-compassion and perceived dieting success, but not the relationship between self-compassion and uncontrolled eating; and this may reflect a difference in the scales. The Perceived Self-Regulatory Success in Dieting Scale (Meule, Papies & Kubler, 2012) is a three-item scale which measures dietary self-regulation more generally, and perhaps stimulated a more cognitive appraisal of success. However, the TFEQ Disinhibition subscale (Stunkard & Messick, 1985) is a 16-item scale which focuses on behavioural examples of uncontrolled eating. Perhaps people who score highly on self-compassion are more likely to believe they are successful at dieting if they are more effective at managing self-critical thinking, but this may not translate to greater control over their eating behaviour.

Unexpectedly, higher self-compassion was not significantly associated with lower levels of uncontrolled eating via lower distress, when the other mediators were included in the model. This was hypothesised because previous studies have found a negative correlation between self-compassion and distress (MacBeth & Gumley, 2012; Neff, 2004), and a positive correlation between distress and uncontrolled eating (Adams & Leary, 2007; Herman & Polivy, 1988; Polivy et al., 1988). The non-significant indirect effect may be because participants were from a community sample and not experiencing high levels of distress. Alternatively, perhaps there was not adequate power to determine an effect or there were suppression effects from other variables. Webb and Forman (2013) found that distress tolerance mediated the indirect effect of higher self-compassion on lower binge eating, using the Emotional Tolerance Scale, which measures the averseness of negative emotions

associated with overeating (Kenardy et al., 1996). Perhaps this scale is a more sensitive measure of distress in relation to eating. Despite this, there was a significant negative correlation between higher self-compassion and lower distress (-.59, (.11), p<.001), and a significant positive association between distress and uncontrolled eating, supporting previous findings (MacBeth & Gumley, 2012).

Interestingly, our exploratory analyses initially found a significant indirect relationship between higher self-compassion and lower BMI through lower rigid control over eating and lower levels of uncontrolled eating. This supports previous research and interventions which incorporate self-compassion for people with eating or weight difficulties (Meule, 2017; Rahimi-Ardabili et al., 2018; Sairanen et al., 2017). However, this was not significant when controlling for attendance at a weight management group; and further analysis showed that people attending a weight management group reported significantly higher levels of uncontrolled eating (p = 0.03). Perhaps participants who experience more uncontrolled eating seek support from a weight management group; or perhaps attending a weight management group increases awareness of uncontrolled eating; or increases rigid control over eating, contributing to uncontrolled eating. Further research could explore these relationships.

Goal adjustment, in terms of disengaging from unattainable goals, re-engaging with new goals, and setting realistic goals, was not a significant mediator of the relationship between higher self-compassion and lower uncontrolled eating. However, there was a significant positive association between self-compassion and goal re-engagement (.38, (.12), p =.002), indicating that people who are more self-compassionate are better at re-engaging with new goals when previous goals have proved to be unattainable. Wrosch, Schier, Miller, Schulz, & Carver (2003) found that higher goal re-engagement was associated with lower distress and greater feelings of self-mastery.

The clinical implications of these findings involve raising awareness amongst health practitioners and the general community of the potential benefits of self-compassion and psychological flexibility for reducing distress and uncontrolled eating. The development of psycho-educational resources and psychological interventions which promote self-compassion and a flexible approach to eating are likely to be beneficial. Compassion Focussed Therapy has been developed as an intervention for people diagnosed with an eating disorder; and aims to reduce shame, self-criticism, and pride in disordered eating behaviour, and enhance self-regulation (Goss & Allen, 2010). Compassion Focussed Therapy was found to be particularly effective at reducing behaviour associated with Bulimia Nervosa when compared with Anorexia Nervosa, including uncontrolled eating (Gale, Gilbert, Read & Goss, 2014). Furthermore, Palmeira, Pinto-Gouveia & Cunha (2017) examined the effectiveness of an intervention incorporating acceptance, mindfulness and compassion for women with overweight and obesity. The participants were separated into an experimental group who received the intervention, and a group who maintained their usual medical and nutritional appointments. Post-intervention, the experimental group reported a significant increase in health-related quality of life and physical exercise frequency; and significantly less emotional and uncontrolled eating, when compared with participants maintaining treatment as usual.

Emerging research also highlights the potential effectiveness of ACT for weight management; which could involve identifying value-based goals, developing awareness of thoughts and decision-making behaviour, and facilitating tolerance of troubling thoughts, urges, cravings, sadness or anxiety (Forman & Butryn, 2015; Lillis & Kendra, 2014; Niemeier, Leahey, Reed, Brown & Wing, 2012). Further longitudinal research is warranted in this area, with more diverse samples of participants.

The relationship between self-compassion and eating behaviour is an emerging area of research and requires more robust study designs; including: larger and more diverse samples in terms of age, gender, socio-economic status, ethnicity and race; data from longitudinal research and randomised controlled trials; and qualitative research to increase the reliability and validity of the findings (Braun et al., 2016; Rahimi-Ardabili et al., 2018). Despite this, self-compassion and psychological flexibility appear to facilitate emotional and behavioural self-regulation, which could prove beneficial for people with eating or weight difficulties and other health conditions (Dowd & Jung, 2017; Dunne, Sheffield, & Chilcot, 2018; Gale et al., 2014; Maraldo, Zhou, Dowling, & Vander Wal, 2016; Sirois et al., 2015; Terry & Leary, 2011; Terry, Leary, Mehta, & Henderson, 2013).

Strengths and limitations

The study was cross-sectional and used correlational data, and therefore does not infer causality. Limitations of using cross-sectional data to examine potential mediator pathways have been debated, due to the understanding that mediation consists of causal processes that unfold over time (Maxwell & Cole, 2007). Consequently, this can produce biased and misleading findings. As a result, it is important to provide a rationale for the temporal order of the variables in the model, and emphasise caution with regard to the interpretation of the results, highlighting an association between variables rather than referring to causation (Hayes, 2017).

Although there was diversity across participants in terms of age and BMI, data on ethnicity and socio-economic status were not obtained. This was to reduce participant demand and facilitate recruitment; however, previous studies have often recruited

predominantly white undergraduate psychology students from higher socio-economic backgrounds, therefore this information is salient (Braun et al., 2016; Rahimi-Ardabili et al., 2018). BMI was self-reported and standardised self-report questionnaires were used to measure the other variables, therefore using more objective measurements such as clinical assessment would have increased the reliability of the data. However, this study was designed to explore mediators and therefore justified. Furthermore, the most commonly used measure of psychological flexibility in relation to weight management is the Acceptance and Action Questionnaire for Weight-Related Difficulties (Lillis & Hayes, 2014); which is perhaps more pertinent to this area of research, compared with the FoReST Scale which has not been widely used (Larkin, 2014). However, the Acceptance and Action Questionnaire for Weight-Related Difficulties measures psychological flexibility more generally; whereas the FoReST Scale specifically captures flexibility of responses to self-critical thoughts, providing more insight into the salient components of a flexible approach to eating.

Another potential limitation is regarding distress as a potential measure of flexibility in behaviour. Distress was measured as a potential mediator in response to findings supporting a significant association between higher self-compassion and lower distress (MacBeth & Gumley, 2012; Neff, 2004), and between higher distress and greater uncontrolled eating (Adams & Leary, 2007; Herman & Polivy, 1988; Polivy et al., 1988). Webb and Forman (2013) found that distress tolerance mediated the indirect effect of higher self-compassion on lower binge eating, using the Emotional Tolerance Scale, which measures the averseness of negative emotions associated with overeating (Kenardy et al., 1996). This scale may be a better measure of flexibility, or the Acceptance and Action Questionnaire for Weight-Related Difficulties (Lillis & Hayes, 2014). This area of research lacks service user involvement in design and implementation, and although people attending weight management groups for

their weight were consulted during the design and recruitment process, they were not involved in implementing the research.

Conclusions

Participants who were highly restrained eaters to lose weight or maintain their weight, reported less uncontrolled eating if they were more self-compassionate, and this was partly explained by less rigid control over their eating. Also, participants who were more self-compassionate believed they were better at regulating their eating, and this was partly explained by their ability to respond to self-critical thinking in flexible way. The relationships via the other mediators related to a flexible approach to dieting were not significant. However, higher self-compassion was associated with greater goal re-engagement after previous goals were unsuccessful, and negatively associated with uncontrolled eating, psychological distress, and in-flexible responses to self-critical thinking.

Our exploratory analyses suggested that higher self-compassion was associated with lower BMI, which was partly explained by less rigid control over eating and less uncontrolled eating. However, this finding was not significant when controlling for attendance at a weight management group (attendees reported significantly higher uncontrolled eating compared to non-attendees). Overall, this area of research and these findings have significant clinical implications for supporting people with eating or weight difficulties; and emphasise the importance of self-compassion and a flexible approach to dieting and health more broadly. This is a promising field of research and future studies should adopt more robust methodologies to increase the reliability and validity of findings.

References

Adams, C. E., & Leary, M. R. (2007). Promoting Self–Compassionate Attitudes Toward Eating Among Restrictive and Guilty Eaters. *Journal of Social and Clinical Psychology*. https://doi.org/10.1521/jscp.2007.26.10.1120

Bond, M. J., McDowell, A. J., & Wilkinson, J. Y. (2001). The measurement of dietary restraint, disinhibition and hunger: An examination of the factor structure of the Three Factor Eating Questionnaire (TFEQ). *International Journal of Obesity*. https://doi.org/10.1038/sj.ijo.0801611

Braun, T. D., Park, C. L., & Gorin, A. (2016). Self-compassion, body image, and disordered eating: A review of the literature. *Body Image*, *17*, 117–131. https://doi.org/10.1016/j.bodyim.2016.03.003

Breines, J., Toole, A., Tu, C., & Chen, S. (2014). Self-compassion, Body Image, and Self-reported Disordered Eating. *Self and Identity*, *13*(4), 432–448. https://doi.org/10.1080/15298868.2013.838992

Cebolla, A., Barrada, J. R., van Strien, T., Oliver, E., & Baños, R. (2014). Validation of the Dutch Eating Behavior Questionnaire (DEBQ) in a sample of Spanish women. *Appetite*. https://doi.org/10.1016/j.appet.2013.10.014

De Carvalho Barreto, M., Ferreira, C., Marta-Simões, J., & Mendes, A. L. (2018). Exploring the paths between self-compassionate attributes and actions, body compassion and disordered eating. *Eating and Weight Disorders*. https://doi.org/10.1007/s40519-018-0581-3

Dowd, A. J., & Jung, M. E. (2017). Self-compassion directly and indirectly predicts dietary adherence and quality of life among adults with celiac disease. *Appetite*, *113*, 293–300.

https://doi.org/10.1016/j.appet.2017.02.023

Dunne, S., Sheffield, D., & Chilcot, J. (2018). Brief report: Self-compassion, physical health and the mediating role of health-promoting behaviours. *Journal of Health Psychology*, *23*(7), 993–999. https://doi.org/10.1177/1359105316643377

Fishbach, A., Friedman, R. S., & Kruglanski, A. W. (2003). Leading Us Not Unto Temptation: Momentary Allurements Elicit Overriding Goal Activation. *Journal of Personality and Social Psychology*. https://doi.org/10.1037/0022-3514.84.2.296

Forman, E. M., & Butryn, M. L. (2015). A new look at the science of weight control: how acceptance and commitment strategies can address the challenge of self-regulation. *Appetite, 84*, 171-180. doi: 10.1016/j.appet.2014.10.004

Gale, C., Gilbert, P., Read, N., & Goss, K. (2014). An Evaluation of the Impact of Introducing Compassion Focused Therapy to a Standard Treatment Programme for People with Eating Disorders. *Clinical Psychology and Psychotherapy*. https://doi.org/10.1002/cpp.1806

Goss, K., & Allan, S. (2014). The development and application of compassion-focused therapy for eating disorders (CFT-E). *British Journal of Clinical Psychology, 53*(1), 62-77. https://guilfordjournals.com/doi/pdfplus/10.1521/ijct.2010.3.2.141

Hayes, S. C. (2016). Acceptance and Commitment Therapy, Relational Frame Theory, and the Third Wave of Behavioral and Cognitive Therapies – Republished Article. *Behavior Therapy*. https://doi.org/10.1016/j.beth.2016.11.006

Hayes, S. C., Luoma, J. B., Bond, F. W., Masuda, A., & Lillis, J. (2006). Acceptance and Commitment Therapy: Model, processes and outcomes. *Behaviour Research and Therapy*. https://doi.org/10.1016/j.brat.2005.06.006

Henry, J. D., & Crawford, J. R. (2005). The short-form version of the Depression anxiety stress scales (DASS-21): Construct validity and normative data in a large non-clinical sample. *British Journal of Clinical Psychology*. https://doi.org/10.1348/014466505X29657

Herman, C. P., & Polivy, J. (1988). Excess and Restraint in Bulimia. In *The Psychology of Bulimia*.

Karlsson, J., Persson, L. O., Sjöström, L., & Sullivan, M. (2000). Psychometric properties and factor structure of the Three-Factor Eating Questionnaire (TFEQ) in obese men and women. Results from the Swedish Obese Subjects (SOS) study. *International Journal of Obesity*. https://doi.org/10.1038/sj.ijo.0801442

Kelly, A. C., Carter, J. C., Zuroff, D. C., & Borairi, S. (2013). Self-compassion and fear of self-compassion interact to predict response to eating disorders treatment: A preliminary investigation. *Psychotherapy Research*. https://doi.org/10.1080/10503307.2012.717310

Larkin, P. (2014). Development and validation of the flexibility of responses to self-critical thoughts scale (forest).

Lillis, J., & Hayes, S. C. (2014). Measuring avoidance and inflexibility in weight related problems. *International Journal of Behavioral Consultation and Therapy*. https://doi.org/10.1037/h0100829

Lillis, J., & Kendra, K. E. (2014). Acceptance and Commitment Therapy for weight control: Model, evidence, and future directions. *Journal of Contextual Behavioral Science, 3*(1), 1-7. doi: 10.1016/j.jcbs.2013.11.005

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*.

Lovibond S.H. & Lovibond, P. F. (1995). Manual for the Depression Anxiety Stress Scales. In *Psychology Foundation of Australia*. https://doi.org/DOI: 10.1016/0005-7967(94)00075-U

MacBeth, A., & Gumley, A. (2012). Exploring compassion: A meta-analysis of the association between self-compassion and psychopathology. *Clinical Psychology Review*. https://doi.org/10.1016/j.cpr.2012.06.003

Maraldo, T. M., Zhou, W., Dowling, J., & Vander Wal, J. S. (2016). Replication and extension of the dual pathway model of disordered eating: The role of fear of negative evaluation, suggestibility, rumination, and self-compassion. *Eating Behaviors*, *23*, 187–194. https://doi.org/10.1016/j.eatbeh.2016.10.008

Marsh, I. C., Chan, S. W. Y., & MacBeth, A. (2018). Self-compassion and Psychological Distress in Adolescents—a Meta-analysis. *Mindfulness*. https://doi.org/10.1007/s12671-017-0850-7

Marshall, E.-J., & Brockman, R. N. (2016). The Relationships Between Psychological Flexibility, Self-Compassion, and Emotional Well-Being. *Journal of Cognitive Psychotherapy*. https://doi.org/10.1891/0889-8391.30.1.60

Maxwell, S. E., & Cole, D. A. (2007). Bias in cross-sectional analyses of longitudinal mediation. *Psychological Methods*, *12*(1), 23. http://dx.doi.org.liverpool.idm.oclc.org/10.1037/1082-989X.12.1.23

Meule, A. (2017). Interactive effects between flexible and rigid control of eating behavior on body weight: a moderated serial multiple mediation model. *Health Psychology Report*. https://doi.org/10.5114/hpr.2017.70206

Meule, A., Papies, E. K., & Kübler, A. (2012). Differentiating between successful and unsuccessful dieters. Validity and reliability of the Perceived Self-Regulatory Success in Dieting Scale. *Appetite*. https://doi.org/10.1016/j.appet.2012.01.028

Neff, K. D. (2004). Self-compassion and Psychological Well-being.pdf. *Constructivism in the Human Sciences*. https://doi.org/10.1037/e633942013-240

Neff, K. D. (2016). The Self-Compassion Scale is a Valid and Theoretically Coherent Measure of Self-Compassion. *Mindfulness*. https://doi.org/10.1007/s12671-015-0479-3

Neff, K. D. (2019). Setting the Record Straight About the Self-Compassion Scale. *Mindfulness*. https://doi.org/10.1007/s12671-018-1061-6

Neff, K. D. (2003). The Development and Validation of a Scale to Measure Self-Compassion. *Self and Identity*. https://doi.org/10.1080/15298860309027

Neff, K. D., & Tirch, D. (2013). Self-compassion and ACT. *Mindfulness, Acceptance, and Positive Psychology: The Seven Foundations of Well-Being*.

Niemeier, H. M., Leahey, T., Reed, K. P., Brown, R. A., & Wing, R. R. (2012). An acceptance-based behavioral intervention for weight loss: a pilot study. *Behavior Therapy*, *43*(2), 427-435. doi: 10.1016/j.beth.2011.10.005

Palmeira, L., Pinto-Gouveia, J., & Cunha, M. (2017). Exploring the efficacy of an acceptance, mindfulness & compassionate-based group intervention for women struggling with their weight (Kg-Free): A randomized controlled trial. *Appetite, 112*, 107-116. https://doi.org/10.1016/j.appet.2017.01.027

Polivy, J., Heatherton, T. F., & Herman, C. P. (1988). Self-Esteem, Restraint, and Eating Behavior. *Journal of Abnormal Psychology*. https://doi.org/10.1037/0021-843X.97.3.354

Rahimi-Ardabili, H., Reynolds, R., Vartanian, L. R., McLeod, L. V. D., & Zwar, N. (2018). A Systematic Review of the Efficacy of Interventions that Aim to Increase Self-Compassion on Nutrition Habits, Eating Behaviours, Body Weight and Body Image. *Mindfulness*, *9*(2), 388–400. https://doi.org/10.1007/s12671-017-0804-0

Reuters. (2018). Global Weight Loss and Weight Management Market 2018 Analysis, Size, Share, Facts and Figures with Products Overview, Services and Forecast 2023 - Reuters.

Sairanen, E., Tolvanen, A., Karhunen, L., Kolehmainen, M., Järvelä-Reijonen, E., Lindroos, S., … Lappalainen, R. (2017). Psychological flexibility mediates change in intuitive eating regulation in acceptance and commitment therapy interventions. *Public Health Nutrition*, *20*(9), 1681–1691. https://doi.org/10.1017/S1368980017000441

Schulte, E. M., Grilo, C. M., & Gearhardt, A. N. (2016). Shared and unique mechanisms underlying binge eating disorder and addictive disorders. *Clinical Psychology Review*. https://doi.org/10.1016/j.cpr.2016.02.001

Sirois, F. M. (2015). A self-regulation resource model of self-compassion and health behavior intentions in emerging adults. *Preventive Medicine Reports*, *2*, 218–222. https://doi.org/10.1016/j.pmedr.2015.03.006

Sirois, F. M., Kitner, R., & Hirsch, J. K. (2015). Self-compassion, affect, and health-promoting behaviors. *Health Psychology : Official Journal of the Division of Health Psychology, American Psychological Association*, *34*(6), 661–669. https://doi.org/10.1037/hea0000158

Stice, E., Nemeroff, C., & Shaw, H. E. (2011). Test of the Dual Pathway Model of Bulimia Nervosa: Evidence for Dietary Restraint and Affect Regulation Mechanisms. *Journal of Social and Clinical Psychology*. https://doi.org/10.1521/jscp.1996.15.3.340

Stice, E., Ziemba, C., Margolis, J., & Flick, P. (1996). The dual pathway model differentiates bulimics, subclinical bulimics, and controls: Testing the continuity hypothesis. *Behavior Therapy*. https://doi.org/10.1016/S0005-7894(96)80042-6

Stunkard, A. J., & Messick, S. (1985). The three-factor eating questionnaire to measure dietary restraint, disinhibition and hunger. *Journal of Psychosomatic Research*. https://doi.org/10.1016/0022-3999(85)90010-8

Taylor, M. B., Daiss, S., & Krietsch, K. (2015). Associations among self-compassion, mindful eating, eating disorder symptomatology, and body mass index in college students. *Translational Issues in Psychological Science*. https://doi.org/10.1037/tps0000035

Terry, M. L., & Leary, M. R. (2011). Self-compassion, self-regulation, and health. *Self and Identity*. https://doi.org/10.1080/15298868.2011.558404

Terry, M. L., Leary, M. R., Mehta, S., & Henderson, K. (2013). Self-Compassionate Reactions to Health Threats. *Personality and Social Psychology Bulletin*. https://doi.org/10.1177/0146167213488213

Tylka, T. L., Russell, H. L., & Neal, A. A. (2015). Self-compassion as a moderator of thinness-related pressures' associations with thin-ideal internalization and disordered eating. *Eating Behaviors*, *17*, 23–26. https://doi.org/10.1016/j.eatbeh.2014.12.009

Van Strien, T., Frijters, J. E. R., Bergers, G. P. A., & Defares, P. B. (1986). The Dutch Eating Behavior Questionnaire (DEBQ) for assessment of restrained, emotional, and external eating behavior. *International Journal of Eating Disorders*. https://doi.org/10.1002/1098-108X(198602)5:2<295::AID-EAT2260050209>3.0.CO;2-T

Van Strien, T. Van, Engels, R. C. M. E., Leeuwe, J. Van, & Snoek, H. M. (2005). The Stice model of overeating: Tests in clinical and non-clinical samples. *Appetite*. https://doi.org/10.1016/j.appet.2005.08.004

Webb, J. B., & Forman, M. J. (2013). Evaluating the indirect effect of self-compassion on binge eating severity through cognitive-affective self-regulatory pathways. *Eating Behaviors, 14*(2), 224–228. https://doi.org/10.1016/j.eatbeh.2012.12.005

Westenhoefer, J., Stunkard, A. J., & Pudel, V. (1999). Validation of the flexible and rigid control dimensions of dietary restraint. *International Journal of Eating Disorders*. https://doi.org/10.1002/(SICI)1098-108X(199907)26:1<53::AID-EAT7>3.0.CO;2-N

Wrosch, C., Scheier, M. F., Miller, G. E., Schulz, R., & Carver, C. S. (2013). Goal Adjustment Scale--(GAS). *Journal of Chemical Information and Modeling*. https://doi.org/10.1017/CBO9781107415324.004

Wrosch, C., Miller, G. E., Scheier, M. F., & De Pontet, S. B. (2007). Giving up on unattainable goals: Benefits for health? *Personality and Social Psychology Bulletin*. https://doi.org/10.1177/0146167206294905

Wrosch, C., Scheier, M. F., & Miller, G. E. (2013). Goal Adjustment Capacities, Subjective Well-being, and Physical Health. *Social and Personality Psychology Compass*. https://doi.org/10.1111/spc3.12074

Yeomans, M. R., Leitch, M., & Mobini, S. (2008). Impulsivity is associated with the disinhibition but not restraint factor from the Three Factor Eating Questionnaire. *Appetite*. https://doi.org/10.1016/j.appet.2007.10.002

Appendices

Appendix A: QATSDD criteria and scoring.

Table 1 Quality assessment tool and scoring guidance notes

Criteria	0 = Not at all	1 = Very slightly	2 = Moderately	3 = Complete
Explicit theoretical framework	No mention at all.	Reference to broad theoretical basis.	Reference to a specific theoretical basis.	Explicit statement of theoretical framework and/or constructs applied to the research.
Statement of aims/objectives in main body of report	No mention at all.	General reference to aim/objective at some point in the report including abstract.	Reference to broad aims/objectives in main body of report.	Explicit statement of aims/objectives in main body of report.
Clear description of research setting	No mention at all.	General description of research area and background, e.g. 'in primary care'.	General description of research problem in the target population, e.g. 'among GPs in primary care'.	Specific description of the research problem and target population in the context of the study, e.g. nurses and doctors from GP practices in the east midlands.
Evidence of sample size considered in terms of analysis	No mention at all.	Basic explanation for choice of sample size. Evidence that size of the sample has been considered in study design.	Evidence of consideration of sample size in terms of saturation/information redundancy or to fit generic analytical requirements.	Explicit statement of data being gathered until information redundancy/saturation was reached or to fit exact calculations for analytical requirements.
Representative sample of target group of a reasonable size	No statement of target group.	Sample is limited but represents some of the target group or representative but very small.	Sample is somewhat diverse but not entirely representative, e.g. inclusive of all age groups, experience but only one workplace. Requires discussion of target population to determine what sample is required to be representative.	Sample includes individuals to represent a cross section of the target population, considering factors such as experience, age and workplace.
Description of procedure for data collection	No mention at all.	Very basic and brief outline of data collection procedure, e.g. 'using a questionnaire distributed to staff'.	States each stage of data collection procedure but with limited detail, or states some stages in details but omits others.	Detailed description of each stage of the data collection procedure, including when, where and how data were gathered.
Rationale for choice of data collection tool(s)	No mention at all.	Very limited explanation for choice of data collection tool(s).	Basic explanation of rationale for choice of data collection tool(s), e.g. based on use in a prior similar study.	Detailed explanation of rationale for choice of data collection tool(s), e.g. relevance to the study aims and assessments of tool quality either statistically, e.g. for reliability & validity, or relevant qualitative assessment.
Detailed recruitment data	No mention at all.	Minimal recruitment data, e.g. no. of questionnaire sent and no. returned.	Some recruitment information but not complete account of the recruitment process, e.g. recruitment figures but no information on strategy used.	Complete data regarding no. approached, no. recruited, attrition data where relevant, method of recruitment.
Statistical assessment of reliability and validity of measurement tool(s) (Quantitative only)	No mention at all.	Reliability and validity of measurement tool(s) discussed, but not statistically assessed.	Some attempt to assess reliability and validity of measurement tool(s) but insufficient, e.g. attempt to establish test–retest reliability is unsuccessful but no action is taken.	Suitable and thorough statistical assessment of reliability and validity of measurement tool(s) with reference to the quality of evidence as a result of the measures used.
Fit between stated research question and method of data collection (Quantitative)	No research question stated.	Method of data collection can only address some aspects of the research question.	Method of data collection can address the research question but there is a more suitable alternative that could have been used or used in addition.	Method of data collection selected is the most suitable approach to attempt answer the research question
Fit between stated research question and format and content of data collection tool e.g. interview schedule (Qualitative)	No research question stated.	Structure and/or content only suitable to address the research question in some aspects or superficially.	Structure & content allows for data to be gathered broadly addressing the stated research question(s) but could benefit from greater detail.	Structure & content allows for detailed data to be gathered around all relevant issues required to address the stated research question(s).
Fit between research question and method of analysis	No mention at all.	Method of analysis can only address the research question basically or broadly.	Method of analysis can address the research question but there is a more suitable alternative that could have been used or used in addition to offer greater detail.	Method of analysis selected is the most suitable approach to attempt answer the research question in detail, e.g. for qualitative IPA preferable for experiences vs. content analysis to elicit frequency of occurrence of events, etc.
Good justification for analytical method selected	No mention at all.	Basic explanation for choice of analytical method	Fairly detailed explanation of choice of analytical method.	Detailed explanation for choice of analytical method based on nature of research question(s).
Assessment of reliability of analytical process (Qualitative only)	No mention at all.	More than one researcher involved in the analytical process but no further reliability assessment.	Limited attempt to assess reliability, e.g. reliance on one method.	Use of a range of methods to assess reliability, e.g. triangulation, multiple researchers, varying research backgrounds.
Evidence of user involvement in design	No mention at all.	Use of pilot study but no involvement in planning stages of study design.	Pilot study with feedback from users informing changes to the design.	Explicit consultation with steering group or statement or formal consultation with users in planning of study design.
Strengths and limitations critically discussed	No mention at all.	Very limited mention of strengths and limitations with omissions of many key issues.	Discussion of some of the key strengths and weaknesses of the study but not complete.	Discussion of strengths and limitations of all aspects of study including design, measures, procedure, sample & analysis.

Appendix B: Systematic review quality assessment using adapted screening tool by Plassman et al., (2010).

Study	Unbiased selection of the cohort?	Sample size calculated?	Adequate description of the cohort?	Validated measure for ascertaining exposure?	Validated measure for ascertaining clinical outcomes?	Adequate follow-up period?	Completeness of follow up/drop-out rate reported?	Analysis controls for confounding?	Analytic methods appropriate?
Breines et al, 2010.	Partially: Prospective study design and recruitment. Inclusion/exclusion criteria described. Only recruited female undergraduate students, for course credit. Adapted scales for self-compassion, self-esteem and disordered eating.	Partially: Did not report conducting a power analysis to determine adequacy of sample size. Sample size large enough for data analysis.	Yes: Age, sex, educational level reported.	Partially: Cross-sectional study. Self-report adapted questionnaires. However used daily experience sampling and lab assessment measures to minimise limitations of correlational design.	Partially: Adapted self-report questionnaires reduce validity and reliability, however used daily experience sampling and lab assessment to measure amount of chocolates eaten. Reported missing data from questionnaires and used Hierarchical Linear Modelling to account for this.	No follow up. Cross-sectional/experimental design.	Yes. No participants dropped out. 8 participants did not complete all of the questionnaires daily, missing data was reported.	Yes.	Yes: Reported missing data from questionnaires in Study 1 and used Hierarchical Linear Modelling to account for this (Kenny et al, 2003; Krull & MacKinnon, 2001). Bootstrapping analyses for mediation followed protocol by Preacher and Hayes (2008).

Study	Unbiased selection of the cohort?	Sample size calculated?	Adequate description of the cohort?	Validated measure for ascertaining exposure?	Validated measure for ascertaining clinical outcomes?	Adequate follow-up period?	Completeness of follow up/drop-out rate reported?	Analysis controls for confounding?	Analytic methods appropriate?
De Carvalho-Barreto et al, 2018.	Partially: Prospective study design, inclusion/exclusion criteria described. However, advertised online using snowball sampling and self-report questionnaires increase bias.	Partially: Did not report conducting a power analysis to determine adequacy of sample size. Sample size large enough for data analysis.	Yes: Age, sex, ethnicity, educational level reported.	Partially, cross sectional study utilising self-report questionnaires.	Yes.	No follow up. Cross-sectional.	Yes.	Yes.	Yes.
Dowd et al, 2017.	Partially: participants recruited from Celiac support groups increasing bias. 91% of participants were female.	Yes.	Yes.	Partially: used self-report questionnaires and adherence to gluten free diet not clinically assessed.	Partially: self-report questionnaires, however reported findings related to reliability/validity.	Yes. Cross-sectional. 1 month follow up, questionnaire completes at two time points.	Yes. Reported drop-outs and potential confounding variables.	Yes.	Yes.
Dunne et al, 2016.	Partially: Opportunistic sampling online may increase bias.	Not sure: did not report power analysis calculation.	Partially: sex, age and education, but not ethnicity.	Partially: self-report. Perhaps reduced bias if physical health assessed objectively.	Partially: self-report validated questionnaires. However, lack of information re. reliability and validity.	No follow-up, cross-sectional design.	Did not explicitly report missing data.	No reporting of confounding variables.	Yes.

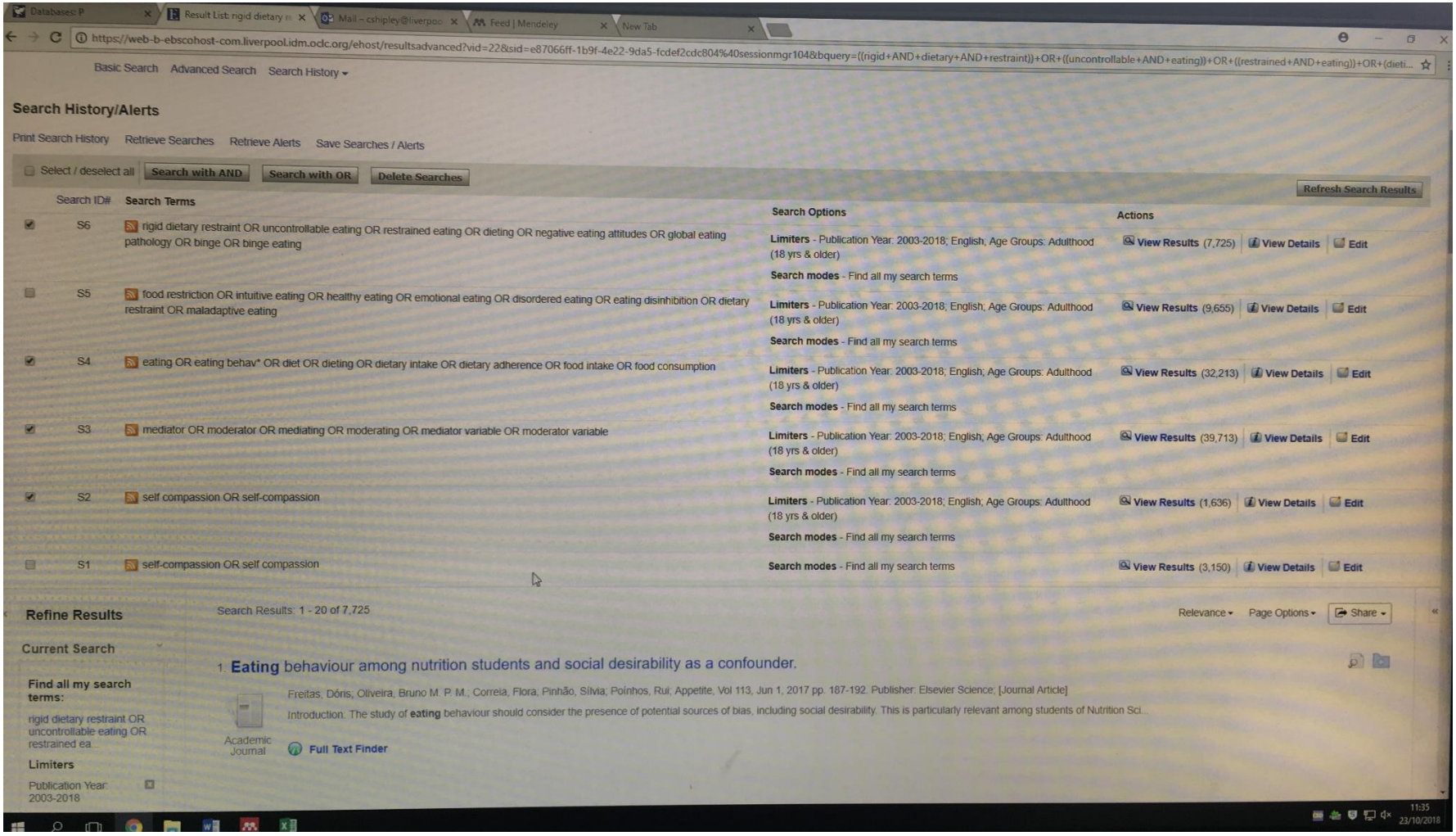
Study	Unbiased selection of the cohort?	Sample size calculated?	Adequate description of the cohort?	Validated measure for ascertaining exposure?	Validated measure for ascertaining clinical outcomes?	Adequate follow-up period?	Completeness of follow up/drop-out rate reported?	Analysis controls for confounding?	Analytic methods appropriate?
Maraldo et al, 2016.	Partially: participants recruited from online data collection services and financially reimbursed.	Partially: power calculation not reported, but sample large enough.	Yes.	Partially: self-report questionnaire, which were validated.		No follow-up, cross-sectional.	Yes.	Yes.	Yes.
Schoenefeld et al 2013.	Partially: participants recruited for course credit.	Partially: power calculation not reported, but sample large enough.	Yes.	Partially-validated self-report questionnaires.	Validated measures used.	Cross-sectional.	Yes.	Yes.	Yes.
Sirois et al, 2014.	Partially: Meta-analysis of 15 independent samples recruited between 2007 and 2013, samples included university students and adults from the community. Participants were reimbursed in various ways: financially and for course credit.	Partially: power calculation not reported for independent samples. Meta-analysis, Fail safe N calculated, need 826 + studies to have non-significant effect.	Yes.	Partially-validated self-report questionnaires. However, questionnaire to measure health behaviours differed across samples.		No follow up period – meta-analysis of 15 independent samples.	Partially, participants with more than 20% missing data were not included. However, this data was not reported in detail.	Yes.	Yes.

Study	Unbiased selection of the cohort?	Sample size calculated?	Adequate description of the cohort?	Validated measure for ascertaining exposure?	Validated measure for ascertaining clinical outcomes?	Adequate follow-up period?	Completeness of follow up/drop-out rate reported?	Analysis controls for confounding?	Analytic methods appropriate?
Sirois et al, 2015.	Partially: young adult university and community sample, advertisements for psychology study and reimbursement via course credit/certificate for online book store.	Partially: No power calculation reported however sample size large enough to detect effect.	Yes.	Partially: Self-report questionnaire to measure key variables. Lack of objective measures od self-efficacy and health intentions.		Cross-sectional.	Can't tell, attrition or missing data not reported.	Yes.	Yes.
Taylor et al, 2015.	Partially: advertised online and recruited from undergraduate psychology research pool.	Partially: No mention of power calculation but sample size appears to be large enough.	Yes.	Partially: validated self-report questionnaire, tested for internal reliability. Self-report BMI, objective measurement would decrease bias.	Ditto.	Cross-sectional, no follow-up period.	Partially: Missing data reported, 9 outliers removed from study (originally 159 participants, 150 included in final analysis).	Yes.	Yes.

Study	Unbiased selection of the cohort?	Sample size calculated?	Adequate description of the cohort?	Validated measure for ascertaining exposure?	Validated measure for ascertaining clinical outcomes?	Adequate follow-up period?	Completeness of follow up/drop-out rate reported?	Analysis controls for confounding?	Analytic methods appropriate?
Webb et al, 2013	No: undergraduate students attending private university, adverts around university and psychology participant "pool". Psychology students were reimbursed with course credit/money.	Yes.	Yes.	Partially: validated self-report questionnaire to measure key variables.	Reliable and valid self-report questionnaires. Could have been enhanced by objective clinical assessment.	Cross-sectional, no follow-up period.	No, missing data not reported.	Yes.	Partially, as with all cross-sectional studies, cannot infer causality.

Note. Grade each criterion as "yes", "no", "partially" or "can't tell".

Appendix C: Photo of systematic review search 23rd October 2018.



Appendix D: Research Proposal Version 3.

One page research proposal: version 3

Name: Catharine Shipley, 11th March 2018.

Title for the project: Is self-compassion associated with successful dietary restraint? The mediating role of psychological flexibility.

Primary supervisor: Dr Charlotte Hardman – Lecturer, Department of Psychological Sciences, University of Liverpool, Eleanor Rathbone Building, Bedford Street South, Liverpool, L69 7ZA. Phone: 0151 7941480 Email: Charlotte.Hardman@liv.ac.uk

Secondary Supervisor: Dr Jo Harrold – Senior Lecturer, Department of Psychological Sciences, University of Liverpool, Eleanor Rathbone Building, Bedford Street South, Liverpool, L69 7ZA. Phone: 0151 795 8513, Email: Harrold@liverpool.ac.uk

External Advisor: Dr Valentina Lorenzetti – Senior Lecturer, School of Psychology, Australia Catholic University, Melbourne Campus (St Patrick), Locked Bag 4115, Fitzroy MDC, VIC 3065, Australia. Email: vlor@liverpool.ac.uk

Aims: The aim of this research is to examine whether people who identify as restrained eaters to manage their weight are more in control of their eating if they report higher levels of self-compassion. The study will also explore other psychological variables related to psychological and behavioural flexibility which may mediate the relation between self-compassion and eating behaviour. The psychological variables to be examined are: goal flexibility (The Goal Adjustment Scale), goal expectancy (the participant's perception of how likely they are to achieve their dietary goals rated on a 5 point Likert scale), flexibility of eating restraint (Eating Inventory Dietary Restraint Scale), psychological flexibility in response to self-critical thoughts (The Flexibility of Responses to Self-critical Thoughts Scale), and level of distress (Depression Anxiety Stress Scales, (DASS)).

Objectives: Further research is necessary to understand the relation between self-compassion, psychological flexibility and eating behaviour. This research will develop current theory and generate clinical implications for interventions which emphasise self-compassion and a flexible approach to weight management.

Hypothesis 1: Restrained eaters who report higher relative to lower self-compassion (independent variable) will be more successful at controlling their eating (dependent variable) (determined by a lower score on Three Factor Eating Questionnaire Disinhibition Scale and a higher score on The Perceived Self-Regulatory Success in Dieting Scale).

Hypothesis 2: The relation between self-compassion and successful control of eating will be mediated by one or more of the following variables: a) higher goal flexibility, b) higher goal expectancy, c) higher flexibility of eating restraint, d) higher psychological flexibility in response to self-critical thoughts, and e) lower distress.

Method: Quantitative. Parallel mediation analysis using PROCESS, followed by serial mediation analysis.

Procedure: Participants will be restrained eaters (identified by the Dutch Eating Behaviour Questionnaire) in the general population. Participants will be recruited by advertising online on social media, email distribution and local weight management groups such as Slimming World. Each participant will complete questionnaires measuring each psychological variable.

Research proposal: version 3

Name: Catharine Shipley

Date of submission: 11th March 2018

Title for the project: Is self-compassion associated with successful dietary restraint? The mediating role of psychological flexibility.

Primary supervisor: Charlotte Hardman – Lecturer, Department of Psychological Sciences, University of Liverpool, Eleanor Rathbone Building, Bedford Street South, Liverpool, L69 7ZA. Phone: 0151 7941480 Email: Charlotte.Hardman@liv.ac.uk

Secondary Supervisor: Dr Jo Harrold – Senior Lecturer, Department of Psychological Sciences, University of Liverpool, Eleanor Rathbone Building, Bedford Street South, Liverpool, L69 7ZA. Phone: 0151 795 8513, Harrold@liverpool.ac.uk

External Advisor: Dr Valentina Lorenzetti – Senior Lecturer, School of Psychology, Australia Catholic University, Melbourne Campus (St Patrick), Locked Bag 4115, Fitzroy MDC, VIC 3065, Australia. Email: vlor@liverpool.ac.uk

Aims

The aim of this research is to examine whether people who identify as restrained eaters to manage their weight are more in control of their eating if they report higher levels of self-compassion. The study will utilise mediational analysis to explore psychological variables which may mediate the relation between self-compassion and control of eating behaviour, specifically: goal flexibility, goal expectancy, flexibility of eating restraint, psychological flexibility in response to self-critical thoughts, and level of distress.

General background

The NHS spends billions annually on treating obesity-related health problems and the associated psychological distress (National Institute for Clinical Excellence, 2006). Interventions in primary care include psycho-education, diet, exercise and behavioural approaches; however they appear to have a limited long-term impact (Booth, Prevost, Wright & Gulliford, 2014). Therefore, further research on the psychological mechanisms which underpin maladaptive eating behaviour is vital, to develop effective interventions and ultimately improve the health and psychological wellbeing of people living with these difficulties.

A popular area of eating behaviour research is dietary restraint (Guerrieri, Nederkoom, Schrooten, Martijin, & Jansen, 2009). Restrained eaters are people who habitually restrict their

food intake to lose weight or maintain a healthy weight; however this is notoriously difficult to achieve (Polivy & Herman, 1985). Herman and Mack (1975) found that high levels of restrained eating can produce a "disinhibition effect", meaning that when restrained eaters break their dietary goals they experience distress and tend to over-eat, which creates a barrier to weight loss. Keller and Van de Horst (2013) recounted that highly restrained eaters in comparison with unrestrained eaters, reported higher levels of psychological distress in relation to eating, and greater conflict between their weight goals and eating for pleasure.

Researchers have distinguished between "successful" and "unsuccessful" restrained eaters, and have attempted to understand why some restrained eaters manage their eating and weight better than others (Stroebe, Koningsbruggen, Papies, & Aarts, 2013). Research has also examined differences between rigid and flexible restraint, and has indicated that flexible restraint is more beneficial for long term weight management (Johnson, Pratt & Wardle, 2012; Sairanen, Lappalainen, Lapveteläinen, Tolvanen, & Karhunen, 2014). Rigid restraint reflects an all or nothing approach to weight management, with periods of strict dieting alternated with periods of indulgence. In contrast, flexible restraint permits the consumption of fattening foods in small amounts and perhaps indicates a more sustainable approach to weight control (Westenhoefer et al., 2013).

To summarise, previous research highlights that a more flexible approach to dietary restraint is favourable for long-term weight management. This study aims to develop the literature by determining whether self-compassion predicts successful control of eating, and to identify whether variables related to psychological and behavioural flexibility mediate this relation.

Brief account of relevant literature

There is growing evidence for the importance of self-compassion in successful weight management; however it is a relatively new area of research (Palmeira, Pinto-Gouveia, & Cunha, 2017). Self-compassion involves responding to ourselves with warmth and understanding rather than self-criticism, especially when we suffer, fail or feel inadequate (Neff, 2003).

Adams and Leary (2007) examined the "disinhibition effect" and asked restrained eaters to break their dietary goals by eating a donut. When the researchers made a statement encouraging self-compassion before eating the donut, restrained eaters subsequently reported less distress and

ate less to compensate, when compared with restrained eaters who did not hear the self-compassion statement. The authors proposed that by encouraging self-compassion they reduced self-critical thoughts and negative feelings after participants disengaged from their diet, allowing the person to remain engaged with their over-arching goals.

Research has shown a negative correlation between self-compassion and maladaptive eating in both clinical (people who had an eating disorder diagnosis) and non-clinical samples of participants (Braun, Park, & Gorin, 2016; Kelly, Vimalakanthan, & Carter, 2014). Studies have found that on days when women reported higher self-compassion they also reported higher levels of intuitive eating, flexible eating behaviour and satisfaction with their bodies (Kelly & Stephen, 2016; Breines, Toole, Tu & Chen, 2014; Schoenefeld & Webb, 2013). One study reported that self-compassion may be indirectly associated with lower binge eating severity through unconditional self-acceptance and emotional tolerance (Webb and Forman, 2013).This emphasises that higher self-compassion may be associated with greater psychological flexibility and wellbeing.

Although the importance of psychological and goal flexibility for behaviour change is well established, further research is necessary in the context of weight management (Wrosch, Scheier, Carver & Schulz, 2003). Setting realistic goals, which may lead to greater goal expectancy and self-efficacy, has been shown to be beneficial for achieving and maintaining weight loss (Elfhag & Rossner, 2005). Wrosch, Miller, Scheier and De Pontet (2007) found that people who were able to disengage from unattainable goals reported better physical health. Fletcher, Hanson, Page and Pine (2011) found that an intervention focused on increasing behavioural flexibility was an effective weight loss strategy. These findings suggest that goal flexibility, and understanding the relation between self-compassion, goal flexibility and eating behaviour, is a neglected but important area of research for weight management.

This study aims to develop the literature by determining whether self-compassion predicts successful control of eating, and to identify potential mediators of this relation, specifically: goal flexibility, goal expectancy, flexibility of restraint, psychological flexibility in response to self-critical thoughts, and distress. With regards to the literature we propose the following research questions and hypotheses:

Q1. Are restrained eaters who report higher self-compassion more successful at controlling their eating?

H1: Restrained eaters who report higher relative to lower self-compassion will be more successful at controlling their eating (score lower on the eating disinhibition scale and higher on the perceived dietary success scale).

Q2. Which variables mediate the relation between self-compassion and control of eating?

H2: The association between self-compassion and successful control of eating will be mediated by one or more of the following variables: a) higher goal flexibility, b) higher goal expectancy, c) higher flexibility of eating restraint, d) higher flexibility in response to self-critical thoughts, and e) lower distress. See Figure 1.

Q3. Do variables found to be significant mediators of the relation between self-compassion and control of eating do so by reducing distress?

H3: This is exploratory and will depend on the variables found to be significant from H2.

Figure 1, a model to illustrate the parallel mediation analysis for hypothesis 2 for each variable.

Design:

The research will utilise a quantitative methodology and cross-sectional design. The use of self-report questionnaires will measure key variables.

Participants:

Male and females aged 18 years and over who are not accessing support from specialist NHS services for their eating behaviour (i.e., community or hospital based weight management services, dietetics, bariatric surgery or eating disorder services) and who identify as restrained eaters by a

score of three or more on the restrained eating scale of the Dutch Eating Behaviour Questionnaire, (DEBQ) (Van Strien, Frijters, Bergers, & Defares, 1986).

Recruitment strategy and procedure:

The research aims to recruit participants by advertising online on social media and by email distribution. The researcher will also contact community weight management groups by email and face to face, to recruit potential participants. This study is cross-sectional; however I will record those who attend a weight management group to control for confounding variables and explore potential differences in self-compassion and psychological flexibility between those who attend and those who do not. This may also generate implications for further research.

All participants will be provided with details of the study and their written informed consent will be obtained prior to completion of the questionnaires. Participants will be notified of their right to withdraw from the study prior to data submission, however once submitted the responses will be unidentifiable due to the anonymisation of the data.

Participants will complete the questionnaires online via Qualtrics. During the initial screening phase to identify restrained eaters (those who score 3 or more on the restrained eating scale of the DEBQ (Van Strien et al., 1986)), participants will be requested to follow a link displayed via social media or email to complete the DEBQ and provide their email address. Their email address will be saved on the researcher' university M: Drive for entry into the prize draw, with the chance of winning one of three Fitbits worth £80 each, as reimbursement for taking part in the study. After I score the initial DEBQ, restrained eaters will be contacted via email (within two weeks of completion) with a second link to complete the DEBQ again, alongside the other questionnaires. These responses will be unidentifiable. To facilitate participation in the study, participants attending a community weight management group can also complete the initial screening DEBQ by hand (and restrained eaters will be provided further questionnaires by email for online completion). A quiet area will be available and the researcher will provide the required information to match online completion. An envelope will be provided for participants to enclose their questionnaire to maintain confidentiality.

Measures

- Restrained Eating: The DEBQ Restraint Scale (Van Strien et al., 1986) will be an initial screening questionnaire to identify restrained eaters. In the paper by Van Strien et al., (1986) the mean score of the general population on the restraint scale was 2.21 and the standard deviation was 0.92, making a total of 3.13. Therefore, I propose that someone who scores 3 or more is above average and can be referred to as a restrained eater.
- Self-compassion (independent variable): The Self Compassion Scale (Neff, 2003).
- Goal flexibility (mediator, (M)): The Goal Adjustment Scale (Wrosch, Scheier, & Miller, 2013).
- Goal expectancy (M): Participants will be asked to list their weight management goals and score each goal on how likely they are to achieve it on a 5 point Likert scale.
- Flexibility of eating restraint (M): The Eating Inventory Dietary Restraint Scale (Stunkard & Messick, 1988), measures flexible and rigid restraint.
- Psychological flexibility in response to self-critical thoughts (M): The FoReST Scale (White et al., in submission).
- Distress (M): Depression Anxiety Stress Scales (DASS) (Crawford & Henry, 2005).
- Eating disinhibition (dependent variable, (DV)): The Three Factor Eating Questionnaire Disinhibition Scale (Stunkard & Messick, 1985).
- Dietary success (DV): The Perceived Self-Regulatory Success in Dieting Scale (Meule, Papies & Kubler, 2012).

Ethical considerations:

Some participants may experience distress while completing the questionnaires. A full debrief letter will be shown to every participant at the end of the study, including the contact details for the researchers and information on how to access support from local NHS and community providers.

Data analysis:

H1: A simple regression analysis will measure the relation between self-compassion and the control of eating behaviour. Age, gender and attendance at a community weight management group will be entered into the analysis to control for the effects.

H2 a-e: A parallel mediation analysis will measure the magnitude and significance of the indirect relations between self-compassion (independent variable) and control of eating (dependent variable) when mediated by each variable (goal flexibility, goal expectancy, flexibility of restraint, flexibility in response to self-critical thoughts, and distress) in parallel. The same analysis will then be repeated with perceived dietary success as the outcome dependent variable. This is shown in Figure 1. By utilising Process (Preacher and Hayes, 2004) we can compare the magnitude of the direct effect between self-compassion and disinhibition (H1) with the total effect of self-compassion on disinhibition including the indirect pathway via each mediator (H2 a-e). The analysis will produce bias-corrected bootstrap confidence intervals for indirect effects via the mediator.

H3: Model 6 in Process will test whether two mediators operating in serial explain the relation between self-compassion and control of eating behaviour. Variables which are found to be significant in the parallel medial analysis (H2) will be tested in serial to determine whether they reduce distress and in turn reduce eating disinhibition. For example, self-compassion will be the IV, mediator 1 will be a significant variable (a-d), mediator 2 will be distress, and the DV will be control of eating.

Power analysis and feasibility of sample:

There is no available test for power calculation for mediator models. However, by utilising guidance on sample size in mediation research (Fritz & Mackinnon, 2007) we anticipate that the study will require a minimum of 71 participants for 80% power with a medium effect size. For the findings to have clinical meaning at least medium effects are required. We anticipate that 20% of participants will drop out; therefore we will aim to recruit more than 90 participants, which appears to be feasible with regard to previous studies which have recruited online on social media. Boyland, Burgon and Hardman (2017) reported that in a sample of 50 participants from the general population, 36% scored 3 or more on the DEBQ restrained eating measure. Therefore to achieve a sample of 90 participants I will aim to screen approximately 250 participants.

Service user consultation:

Attendees of a community weight management group will be approached for general feedback on the study, including the procedure, materials, and information sheets. These participants will not be included in the study to remove potential bias; however they will be included in the prize draw.

Permission of ethics committees:

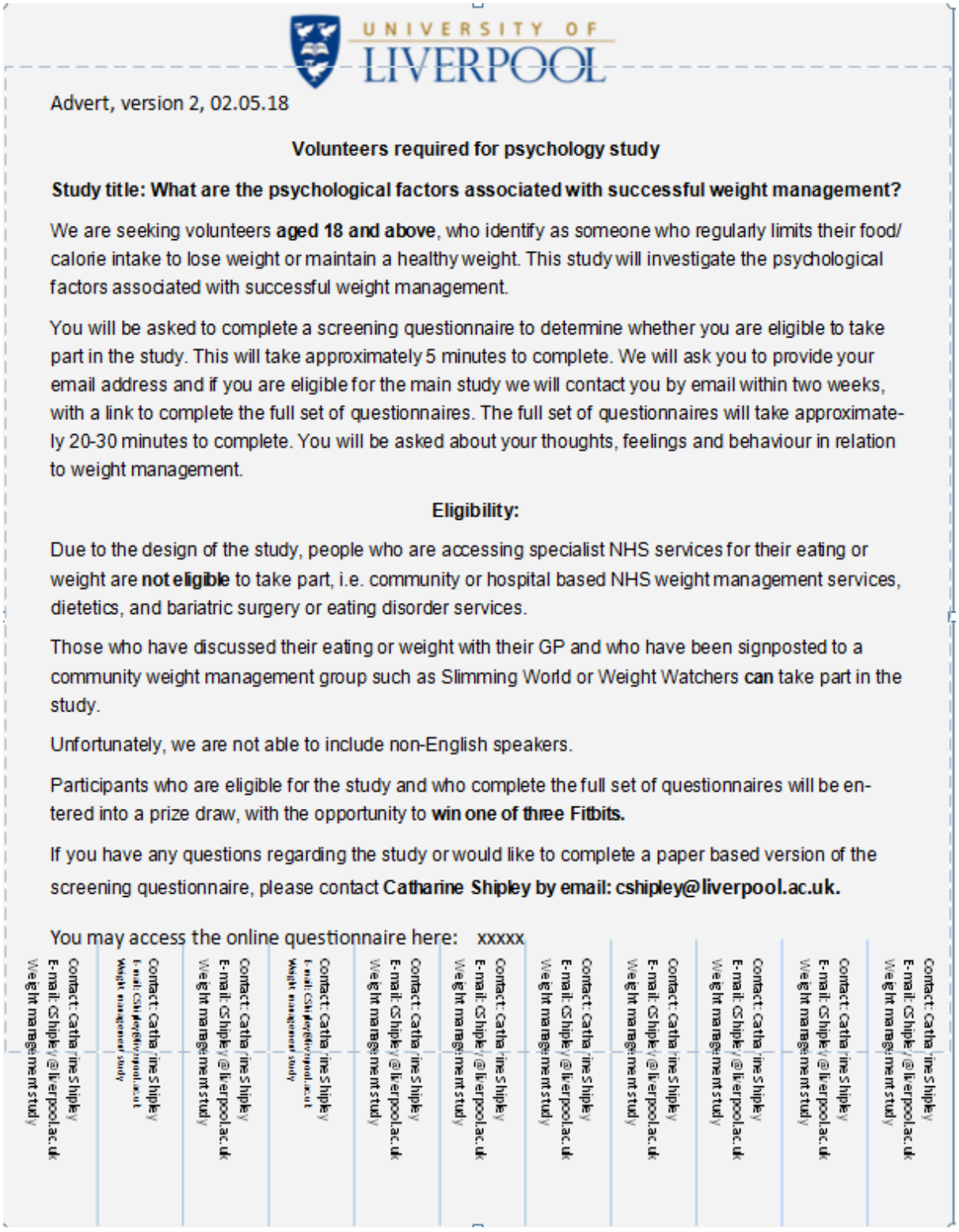
The research will recruit a non-clinical sample therefore ethical approval will only be sought from the Institute of Psychology, Health and Society Research Ethics Committee.

End of Study: 2019 on passing viva.

Archiving: Data and all appropriate documentation will be stored for 10 years after the completion of the study. The information will be held under locked conditions at University of Liverpool under the custody of Charlotte Hardman.

Publication: The study will be written up for publication in a peer-reviewed journal. The target journals are Appetite and the British Journal of Health Psychology.

Appendix E: Study advertisement.



UNIVERSITY OF LIVERPOOL

Advert, version 2, 02.05.18

Volunteers required for psychology study

Study title: What are the psychological factors associated with successful weight management?

We are seeking volunteers **aged 18 and above**, who identify as someone who regularly limits their food/ calorie intake to lose weight or maintain a healthy weight. This study will investigate the psychological factors associated with successful weight management.

You will be asked to complete a screening questionnaire to determine whether you are eligible to take part in the study. This will take approximately 5 minutes to complete. We will ask you to provide your email address and if you are eligible for the main study we will contact you by email within two weeks, with a link to complete the full set of questionnaires. The full set of questionnaires will take approximately 20-30 minutes to complete. You will be asked about your thoughts, feelings and behaviour in relation to weight management.

Eligibility:

Due to the design of the study, people who are accessing specialist NHS services for their eating or weight are **not eligible** to take part, i.e. community or hospital based NHS weight management services, dietetics, and bariatric surgery or eating disorder services.

Those who have discussed their eating or weight with their GP and who have been signposted to a community weight management group such as Slimming World or Weight Watchers **can** take part in the study.

Unfortunately, we are not able to include non-English speakers.

Participants who are eligible for the study and who complete the full set of questionnaires will be entered into a prize draw, with the opportunity to **win one of three Fitbits.**

If you have any questions regarding the study or would like to complete a paper based version of the screening questionnaire, please contact **Catharine Shipley by email: cshipley@liverpool.ac.uk.**

You may access the online questionnaire here: xxxxx

Appendix F: Ethical approval letter.

UNIVERSITY OF LIVERPOOL

Health and Life Sciences Research Ethics Committee (Psychology, Health and Society)

16 May 2018

Dear Dr Hardman

I am pleased to inform you that your application for research ethics approval has been approved. Application details and conditions of approval can be found below. Appendix A contains a list of documents approved by the Committee.

Application Details

Reference:	2603
Project Title:	What are the psychological factors associated with successful weight management?
Principal Investigator/Supervisor:	Dr Charlotte Hardman
Co-Investigator(s):	Ms Catharine Shipley, Dr Jo Harrold
Lead Student Investigator:	-
Department:	Psychological Sciences
Approval Date:	16/05/2018
Approval Expiry Date:	Five years from the approval date listed above

The application was **APPROVED** subject to the following conditions:

Conditions of approval

- All serious adverse events must be reported via the Research Integrity and Ethics Team (ethics@liverpool.ac.uk) within 24 hours of their occurrence.
- If you wish to extend the duration of the study beyond the research ethics approval expiry date listed above, a new application should be submitted.
- If you wish to make an amendment to the research, please create and submit an amendment form using the research ethics system.
- If the named Principal Investigator or Supervisor leaves the employment of the University during the course of this approval, the approval will lapse. Therefore it will be necessary to create and submit an amendment form using the research ethics system.
- It is the responsibility of the Principal Investigator/Supervisor to inform all the investigators of the terms of the approval.

Kind regards,

Health and Life Sciences Research Ethics Committee (Psychology, Health and Society)

iphsrec@liverpool.ac.uk

0151 795 5420

Appendix - Approved Documents

(Relevant only to amendments involving changes to the study documentation)

The final document set reviewed and approved by the committee is listed below:

Document Type	File Name	Date	Version
Questionnaire	Self-Compassion Scale Neff	20/10/2017	1
Questionnaire	Goal Adjustment Scale	20/10/2017	1
Questionnaire	The Flexibility of Responses to Self Critical Thoughts	20/10/2017	1
Questionnaire	Depression Anxiety and Stress Scales	20/10/2017	1
Questionnaire	Perceived self-regulatory success in dieting scale	20/10/2017	1
Evidence Of Peer Review	RRC approval letter	21/11/2017	1
Questionnaire	3 TFEQ Disinhibition	09/02/2018	1
Questionnaire	Items to assess Flexible and Rigid Control from the Eating Inventory	09/02/2018	1
Questionnaire	DEBQ restraint scale	09/02/2018	1
Study Proposal/Protocol	Research proposal version 3	11/03/2018	3
Evidence Of Peer Review	CatharineShipley_ProposalAppproval_V3	16/03/2018	3
Questionnaire	Debrief	18/03/2018	1
Advertisement	Advert version 2 2.05.18	02/05/2018	2
Participant Consent Form	Paticipant consent form version 2 02.05.18	09/05/2018	2
Participant Information Sheet	Participant information sheet version 1	09/05/2018	1

Appendix G: Participant information sheet version 1.

Participant information sheet,
Version 1, 30.01.2018

UNIVERSITY OF LIVERPOOL

Study Title: What are the psychological factors associated with successful weight management?

You are being invited to participate in a research study. Before you decide whether to participate, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and feel free to ask us if you would like more information or if there is anything that you do not understand. We would like to stress that you do not have to accept this invitation and should only agree to take part if you want to.

What is the purpose of the study?

This study aims to investigate the psychological factors associated with successful weight management.

Who can take part in the study?

We invite anyone who is aged 18 and above, who identifies as someone who regularly limits their food or calorie intake to lose weight or maintain a healthy weight. Due to the design of the study, people who are accessing specialist NHS services for their eating or weight are **not** eligible to take part, i.e. community or hospital based NHS weight management services, dietetics, and bariatric surgery or eating disorder services.

Those who have discussed their eating or weight with their GP and who have been signposted to a community weight management group such as Slimming World or Weight Watchers **can** take part in the study.

Do I have to take part?

No, participation is entirely voluntary. You are free to withdraw before your responses are submitted online, without explaining why or without any negative consequences. Your responses will be anonymous, this means that your data does not include any of your personal details that could identify you.

What will happen if I take part?

You will be asked to provide your email address and complete a screening questionnaire, either online or on paper, to determine whether you can take part in the study. If you are eligible to take part you will receive an email from Catharine Shipley (Lead Researcher) within two weeks of completing the screening questionnaire, with a link to complete the other questionnaires online. Once your answers are submitted online you will **not** be able to withdraw from the study because your responses will **not** be identifiable. You can withdraw from the study at any time before your responses to the questionnaires are submitted online.

UNIVERSITY OF LIVERPOOL

Methods

The screening questionnaire will take approximately 5 minutes to complete. The full set of questionnaires will take approximately 20-30 minutes to complete. The anonymised responses from the submitted questionnaires will be analysed to better understand the psychological factors associated with successful weight management.

Storage of data

Participant email addresses will be saved separately on the researcher's drive on the University's secure server and will be deleted immediately after the prize draw (see below) in May 2019. The data stored online on the secure server will be unidentifiable and will be available to other researchers by request for further research. Screening questionnaires and participant consent forms completed on paper will be stored securely in a locked cabinet at the University of Liverpool. It is widespread practice for questionnaires to be stored securely for up to ten years.

Reimbursement

Anyone who completes the full set of questionnaires can consent to being entered into a prize draw to win one of three Fitbits worth £80 each, as reimbursement for taking part in the study. Winners of the prize draw will be notified before May 2019.

Are there any risks in taking part?

We believe that there are minimal risks in taking part, however some participants could potentially become distressed when completing the questionnaires. We have included a list of organisations to contact should you need further support. If you experience any discomfort or disadvantage due to taking part in the research we encourage you to inform Catharine Shipley immediately (see below for full contact details). The other researchers are also available if you would prefer to contact them.

Are there any benefits in taking part?

Participants may benefit from increased insight into their thoughts, feelings and behaviour in relation to their weight management.

What if I am unhappy or if there is a problem?

If you are unhappy, or if there is a problem, please feel free to let us know by contacting the researchers and we will try to help. If you remain unhappy or have a complaint which you feel you cannot come to us with then you should contact the Research Ethics and Integrity Office at ethics@liv.ac.uk. When contacting the Research Ethics and Integrity Office, please provide details of the name or description of the study (so that it can be identified), the researcher(s) involved, and the details of the complaint you wish to make."

Will my participation be kept confidential?

Yes. Your data from the screening questionnaire and your email address whether submitted face to face or online will only be known by Catharine Shipley and your responses will not be linked with your email once eligibility for the study has been confirmed. Your responses on the full set of questionnaires submitted online will be fully anonymised.

What will happen to the results of the study?

The anonymous results from the study will be analysed and reported by Catharine Shipley as a thesis dissertation for the Doctorate in Clinical Psychology at the University of Liverpool. The final report will also be submitted for publication in a Peer Reviewed Journal and presented at an academic conference. Furthermore, the anonymous data will be available on request for future research.

What will happen if I want to stop taking part?

Participants are free to withdraw at any time before they submit their anonymised data online. Participants do not have to provide an explanation and will not be disadvantaged in any way.

Who can I contact if I have further questions?

The Researchers:

Catharine Shipley, Trainee Clinical Psychologist at the University of Liverpool (Lead Researcher). Phone: 07450 44 8898. **Email: cshipley@liverpool.ac.uk**.

Dr Charlotte Hardman, Lecturer at the Department of Psychological Sciences, University of Liverpool. Phone: 0151 794 1480, **Email**: Charlotte.Hardman@liv.ac.uk.

Appendix H: Participant consent form.

UNIVERSITY OF LIVERPOOL

Participant consent form

Study Title: What are the psychological factors associated with successful weight management?

The Researchers:
Catharine Shipley, Trainee Clinical Psychologist at the University of Liverpool (Lead Researcher). Phone: 07450 449 8898. **Email:** cshipley@liverpool.ac.uk.

Dr Charlotte Hardman, Lecturer at the Department of Psychological Sciences, University of Liverpool. Phone: 0151 794 1480, **Email**: Charlotte.Hardman@liv.ac.uk.

1. I confirm that I have read and understood the information sheet dated 30.1.18.
2. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.
3. I understand that in order to take part in the study I should be 18 years or older.
4. I understand that my participation is voluntary and that I am free to withdraw at any time prior to my data being submitted to the online database (and therefore unidentifiable) without giving any reason, and without my rights being affected.
5. I understand that I must not take part if I am accessing support for my eating or weight from specialist NHS services i.e. community or hospital based weight management services, dietetics, and bariatric surgery or eating disorder services.
6. I understand that once I complete the study, the data I provide will be anonymised. At this point it will be no longer possible for me to access or withdraw my data.
7. I understand that my anonymised data will be shared with any other organisations or researchers that request access to it.
8. Before you start the study please tick the box to confirm you agree with all the above points. ☐

Participant name	Date	Signature
Name of person taking consent	Date	Signature

Researcher	Date	Signature

Principal Investigator

Dr Charlotte Hardman

Lecturer, Department of Psychological Science
University of Liverpool
Eleanor Rathbone Building
Bedford Street South
Liverpool, L69 7ZA, UK.
Phone: +44 (0)151 7941480

Email: Charlotte.Hardman@liverpool.ac.uk

Student Investigator

Catharine Shipley

Trainee Clinical Psychologist
Department of Clinical Psychology
Whelan Building
Brownlow Hill
Liverpool, L69 3GB
Phone: +44 (0) 7450448898

Email: cshipley@liverpool.ac.uk

Appendix I: Participant debrief information sheet.

UNIVERSITY OF LIVERPOOL

Debrief

Thank you for taking part in this study.

What was the study about?

The aim of this study is to better understand the psychological factors associated with successful weight management. Particularly, the relationship between self-compassion, psychological flexibility and a person's control over their eating.

The questionnaires you have completed allow us to see what factors are most important to help us better understand these relationships.

The findings are likely to have important implications for health improvement strategies and support services.

Please feel free to ask the researcher if you have any further questions.

What if I want advice or I am worried about my health or wellbeing following the research?

We are not qualified to offer advice ourselves. We would recommend that you talk to your GP if you are worried about your health or wellbeing. The following information from these sources may also be informative:

http://www.nhs.uk/conditions/stress-anxiety-depression/pages/low-mood-and-depression.aspx
http://www.nhs.uk/Tools/Pages/Healthyweightcalculator.aspx
http://www.b-eat.co.uk/
Samaritans 08457 90 90 90 for confidential, non-judgmental emotional support.

Who can I contact if I have further questions about the research?

If you have any questions please contact me: Catharine Shipley, Doctorate in Clinical Psychology Training Programme, Whelan Building, University of Liverpool, Liverpool, L69 3GB. Email: CShipley@liverpool.ac.uk Tel: 07450 448898.

If you do not feel you can come to me you can alternatively contact my supervisor Dr Charlotte Hardman Tel: 0151 794 1480 Email: charlotte.hardman@liverpool.ac.uk. If you remain unhappy or have a complaint which you feel you cannot come to me with then you should contact the Research Governance Officer at ethics@liv.ac.uk. When contacting the Research Governance Officer, please provide details of the name or description of the study (so that it can be identified), the researcher(s) involved, and the details of the complaint you wish to make.

Version 1
18.03.18

Appendix J: Self-Compassion Scale (Neff, 2003).

HOW I TYPICALLY ACT TOWARDS MYSELF IN DIFFICULT TIMES

Please read each statement carefully before answering. To the left of each item, indicate how often you behave in the stated manner, using the following scale:

Almost never				Almost always
1	2	3	4	5

_____ 1. I'm disapproving and judgmental about my own flaws and inadequacies.
_____ 2. When I'm feeling down I tend to obsess and fixate on everything that's wrong.
_____ 3. When things are going badly for me, I see the difficulties as part of life that everyone goes through.
_____ 4. When I think about my inadequacies, it tends to make me feel more separate and cut off from the rest of the world.
_____ 5. I try to be loving towards myself when I'm feeling emotional pain.
_____ 6. When I fail at something important to me I become consumed by feelings of inadequacy.
_____ 7. When I'm down and out, I remind myself that there are lots of other people in the world feeling like I am.
_____ 8. When times are really difficult, I tend to be tough on myself.
_____ 9. When something upsets me I try to keep my emotions in balance.
_____ 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 intolerant and impatient towards those aspects of my personality I don't like.
_____ 12. When I'm going through a very hard time, I give myself the caring and tenderness I need.
_____ 13. When I'm feeling down, I tend to feel like most other people are probably happier than I am.
_____ 14. When something painful happens I try to take a balanced view of the situation.
_____ 15. I try to see my failings as part of the human condition.
_____ 16. When I see aspects of myself that I don't like, I get down on myself.
_____ 17. When I fail at something important to me I try to keep things in perspective.

_____ 18. When I'm really struggling, I tend to feel like other people must be having an easier time of it.

_____ 19. I'm kind to myself when I'm experiencing suffering.

_____ 20. When something upsets me I get carried away with my feelings.

_____ 21. I can be a bit cold-hearted towards myself when I'm experiencing suffering.

_____ 22. When I'm feeling down I try to approach my feelings with curiosity and openness.

_____ 23. I'm tolerant of my own flaws and inadequacies.

_____ 24. When something painful happens I tend to blow the incident out of proportion.

_____ 25. When I fail at something that's important to me, I tend to feel alone in my failure.

_____ 26. I try to be understanding and patient towards those aspects of my personality I don't like.

Appendix K: Dutch Eating Behaviour Questionnaire.

DEBQ restraint scale, Van Strien, Frijters, Bergers and Defares (1986).

1.	If you have put on weight do you eat less than you usually do?	Never	Seldom	Sometimes	Often	Very often
2.	Do you try to eat less at meal times than you would like to eat?					
3.	How often do you refuse food or drink offered because you are concerned about your weight?					
4.	Do you watch exactly what you eat?					
5.	Do you deliberately eat foods that are slimming?					
6.	When you have eaten too much, do you eat less than usual the following days?					
7.	Do you deliberately eat less in order not to become heavier?					
8.	How often do you try not to eat between your meals because you are watching your weight?					
9.	How often in the evening do you try not to eat because you are watching your weight?					
10.	Do you take into account your weight with what you eat?					

Appendix L: Goal Adjustment Scale.

Goal Adjustment Scale (GAS)

During their lives people cannot always attain what they want and are sometimes forced to stop pursuing the goals they have set. We are interested in understanding how you usually react when this happens to you. Please indicate the extent to which you agree or disagree with each of the following statements, as it usually applies to you.

If I have to stop pursuing an important goal in my life…	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
1. It's easy for me to reduce my effort towards the goal.					
2. I convince myself that I have other meaningful goals to pursue.					
3. I stay committed to the goal for a long time; I can't let it go.					
4. I start working on other new goals.					
5. I think about other new goals to pursue					
6. I find it difficult to stop trying to achieve the goal.					
7. I seek other meaningful goals.					
8. It's easy for me to stop thinking about the goal and let it go.					
9. I tell myself that I have a number of other new goals to draw upon.					
10. I put effort toward other meaningful goals.					

Appendix M: Flexibility of Responses to Self-Critical Thoughts Scale.

The Flexibility of Responses to Self-critical Thoughts Scale (FoReST-12; White et al. in submission)

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

1	2	3	4	5	6	7
Never true	Very seldom true	Seldom true	Sometimes true	Frequently true	Almost always true	Always true

When I have a critical thought about myself….

1. ….It makes me lose control of my behaviour	1	2	3	4	5	6	7
2. ….I do things I later regret	1	2	3	4	5	6	7
3. ….I feel so disgusted at myself that I don't act the way I should	1	2	3	4	5	6	7
4. ….I feel so ashamed that I don't act the way I should	1	2	3	4	5	6	7
5. ….I don't treat others the way I would like	1	2	3	4	5	6	7
6. ….I act in a way that makes life more difficult for me	1	2	3	4	5	6	7
7. ….I don't treat myself the way I would like	1	2	3	4	5	6	7
8. ….It gets me so down that I don't act the way I should	1	2	3	4	5	6	7
9. ….I try to ignore it.	1	2	3	4	5	6	7
10. ….I try not to think about it	1	2	3	4	5	6	7
11. ….I try to block out any feelings it creates	1	2	3	4	5	6	7
12. ….I pretend it's not there	1	2	3	4	5	6	7

The Flexibility of Responses to Self-critical Thoughts Scale- FoReST-12

Appendix N: Depression Anxiety and Stress Scales – 21.

DASS 21 NAME _____ DATE _____

BLACK DOG INSTITUTE

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

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

Appendix O: Perceived Self-Regulatory Success in Dieting Scale.

Appendix A. English, Dutch, and German version of the PSRS

Item		Response categories							
English version									
1. How successful are you in watching your weight?	Not successful	1	2	3	4	5	6	7	Very successful
2. How successful are you in losing extra weight?	Not successful	1	2	3	4	5	6	7	Very successful
3. How difficult do you find it to stay in shape?[a]	Not difficult	1	2	3	4	5	6	7	Very difficult
Dutch version									
1. Hoe goed lukt het je om op je gewicht te letten?	Helemaal niet goed	1	2	3	4	5	6	7	Heel goed
2. Hoe goed lukt het je om af te vallen?	Helemaal niet goed	1	2	3	4	5	6	7	Heel goed
3. Hoe moeilijk vind je het om in vorm te blijven?[a]	Helemaal niet moeilijk	1	2	3	4	5	6	7	Heel moeilijk
German version									
1. Wie gut gelingt es dir auf Dein Gewicht zu achten?	Überhaupt nicht gut	1	2	3	4	5	6	7	Sehr gut
2. Wie gut gelingt es dir abzunehmen?	Überhaupt nicht gut	1	2	3	4	5	6	7	Sehr gut
3. Wie schwierig findest du es in Form zu bleiben?[a]	Überhaupt nicht schwierig	1	2	3	4	5	6	7	Sehr schwierig

[a] Item is reversed coded.

Appendix P: Rigid and Flexible Control over eating subscales of the Three Factor Eating Questionnaire.

Items to assess Flexible and Rigid Control from the Three Factor Eating Questionnaire, Westenhoefer, Stunkard, and Pudel (1999).

Flexible Control

1.	When I have eaten my quota of calories, I am usually good about not eating any more.	True	False
2.	I deliberately take small helpings as a means of weight control.	True	False
3.	While on a diet, if I eat food that is not allowed, I consciously eat less for a period of time to make up for it.	True	False
4.	I consciously hold back at meals in order not to gain weight.	True	False
5.	I pay a great deal of attention to changes in my figure.	True	False

6.	How conscious are you of what you are eating?	Not at all	Slightly	Moderately	Extremely

7.	How likely are you to consciously eat less than you want?	Unlikely	Slightly unlikely	Moderately likely	Very likely

8.	If I eat a little bit more on one day, I make up for it the next day.	True	False
9.	I pay attention to my figure but I still enjoy a variety of foods.	True	False
10.	I prefer light foods that are not fattening.	True	False
11.	If I eat a little bit more during one meal, I make up for it at the next meal.	True	False

12.	Do you deliberately restrict your intake during meals even though you would like to eat more?	Always	Often	Rarely	Never

Rigid Control

1.	I have a pretty good idea of the number of calories in common food.	True	False
2.	I count calories as a conscious means of controlling my weight.	True	False

3.	How often are you dieting in a conscious effort to control your weight?	Rarely	Sometimes	Usually	Always
4.	Would a weight fluctuation of 5 lb affect the way you live your life?	Not at all	Slightly	Moderately	Very much
5.	Do feelings of guilt about overeating help you to control your food intake?	Never	Rarely	Often	Always
6.	How frequently do you avoid stocking up on tempting foods?	Almost Never	Seldom	Usually	Always
7.	How likely are you to shop for low calorie foods?	Unlikely	Slightly unlikely	Moderately likely	Very likely

8.	I eat diet foods, even if they do not taste very good.	True	False
9.	A diet would be too boring a way for me to lose weight.	True	False
10.	I would rather skip a meal than stop eating in the middle of one.	True	False
11.	I alternate between times when I diet strictly and between times when I don't pay much attention to what and how much I eat.	True	False
12.	Sometimes I skip meals to avoid gaining weight.	True	False
13.	I avoid some foods on principle even though I like them.	True	False
14.	I try to stick to a plan when I lose weight.	True	False
15.	Without a diet plan I wouldn't know how to control my weight.	True	False
16	Quick success is most important for me during a diet.	True	False

Appendix Q: Three Factor Eating Questionnaire Disinhibition Scale.

1. When I smell delicious food, I find it very difficult to keep from eating, even if I have just finished a meal.	**True**	**False**
2. I usually eat too much at social occasions, like parties and picnics.	**True**	**False**
3. Sometimes things just taste so good that I keep on eating even when I am no longer hungry.	**True**	**False**
4. When I feel anxious I find myself eating.	**True**	**False**
5. Since my weight goes up and down, I have gone on reducing diets more than once.	**True**	**False**
6. When I am with someone who is overeating I usually overeat too.	**True**	**False**
7. Sometimes when I start eating, I just can't seem to stop.	**True**	**False**
8. It is not difficult for me to leave something on my plate. R	**True**	**False**
9. When I feel blue I often overeat.	**True**	**False**
10. My weight has hardly changed at all in the last ten years. R	**True**	**False**
11. When I feel lonely, I console myself by eating.	**True**	**False**
12. Without even thinking about it, I take a long time to eat. R	**True**	**False**
13. While on a diet, if I eat a food that is not allowed I often then splurge and eat other high calorie foods	**True**	**False**

14. Do you eat sensibly in front of others and splurge alone?

1	**2**	**3**	**4**
Never	**Rarely**	**Often**	**Always**

15. Do you go on eating binges even though you are not hungry?

1	**2**	**3**	**4**
Never	**Rarely**	**Often**	**Always**

16. To what extent does this statement describe your eating behaviour? "I start dieting in the morning, but because of any number of things that happen during the day, by evening I have given up and eat what I want, promising myself to start dieting again tomorrow."

1	**2**	**3**	**4**
Not like me	**Little like me**	**Pretty good description of me**	**Describes me perfectly**

Appendix R: Poster presentation (European Congress on Obesity, 2019).

UNIVERSITY OF LIVERPOOL

Explaining the association between self-compassion and eating behaviour in a community sample of restrained eaters

Catharine Shipley, Dr Jo Harrold (Secondary Supervisor) & Dr Charlotte A. Hardman (Primary Supervisor)
Doctorate in Clinical Psychology Training Programme & Department of Psychological Sciences, University of Liverpool, UK

Email: CShipley@Liverpool.ac.uk, Twitter: @CatharineShip11

1. Introduction

- Self-compassion refers to responding to ourselves with warmth and understanding rather than self-criticism. There is emerging evidence that higher self-compassion is associated with lower levels of uncontrolled eating, however the mediators of this relationship are unclear.
- This study aimed to identify potential psychological mediators in a community sample of restrained eaters dieting to lose weight or maintain their weight.
- As higher self-compassion is also associated with higher psychological flexibility and lower distress, we focused on the following mediators; distress, flexible responses to self-critical thoughts (FoReST), flexible goals and how realistic these goals are, and flexible control over eating.

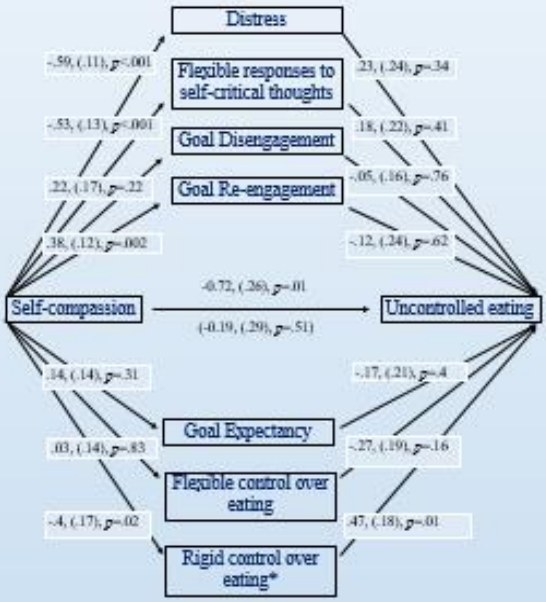
2. Methods

- Eighty eight adults (89.77% female) from a community sample, who were highly restrained eaters, were included in the analyses.
- Participants completed the following questionnaires using an online platform; self-compassion (Self-Compassion Scale), uncontrolled eating (Three Factor Eating Questionnaire Disinhibition Scale), distress (Depression Anxiety and Stress Scale), flexible responses to self-critical thoughts (FoReST Scale), flexible goals (Goal Adjustment Scale), how realistic goals are (5 point Likert scale), and flexible control over eating (Three Factor Eating Questionnaire Rigid and Flexible Control subscales).
- Bootstrapping using PROCESS tested the significance of the direct relationship between self-compassion and uncontrolled eating and the indirect effects via the mediators. Age and gender were controlled for in the model.

3. Results

- There was a significant indirect effect of (higher) self-compassion on (lower) uncontrolled eating via the Rigid Control subscale (B= -.2028, standard error (SE) = .1, lower confidence interval (CI) = -.4218, upper CI = -.0353).
- There were no significant indirect effects via any of the other mediators (Figure 1). Exploratory analyses found a significant serial indirect effect of (higher) self-compassion on (lower) Body Mass Index, via (lower) rigid control and (lower) uncontrolled eating, however this became non-significant when controlling for attendance at a weight management group.

Figure 1. Regression coefficients are shown with standard error in brackets, B(SE). Value in parentheses is the direct effect when controlling for indirect effects. Significant indirect relationships between self-compassion and uncontrolled eating are identified by an asterisk *.



4. Conclusions

- Highly restrained eaters who were higher in self-compassion reported significantly lower levels of uncontrolled eating, and this relationship was explained by less rigid control over their eating.
- These findings have important clinical implications for people experiencing eating or weight difficulties, by providing new evidence for the importance of self-compassion and flexible control in relation to dieting.

References

- Braun, T. D., Park, C. L., & Gorin, A. (2016). Self-compassion, body image, and disordered eating: A review of the literature. Body image, 17, 117-131.
- Hayes, A. F. (2017). Introduction to mediation, moderation, and conditional process analysis: A regression-based approach. UK: Guilford Publications.
- Neff, K. (2003a). Self-compassion: An alternative conceptualization of a healthy attitude toward oneself. *Self and identity*, *2*(2), 85-101.
- Neff, K. D. (2003b). The development and validation of a scale to measure self-compassion. *Self and Identity*, *2*(3), 223-250.