

# RESEARCH IN HEALTH PSYCHOLOGY

RESEARCH THESIS:

## **THE ROLE OF PSYCHOLOGICAL INFLEXIBILITY IN THE TRIPARTITE INFLUENCE MODEL FOR WOMEN: A SINGLE BODY IMAGE INFLEXIBILITY PATHWAY TO DISORDERED EATING BEHAVIOURS**

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This thesis is dedicated to my husband Mark Bandalli - for his reassurance, humour, his gentle reminders that a world outside of this thesis does *in fact* exist and most importantly for his endless supply of chocolate.

## **Foreword: Undertaking the Professional Doctorate in Health Psychology**

I have been undertaking the Professional Doctorate in Health Psychology since January 2012 and I passed all taught components of the course by February 2015. The Professional Doctorate in Health Psychology involved completing **five areas of competency** outlined by the British Psychological Society's Board of Examiners in Health Psychology. These are:

**1. Professional Skills in Health Psychology:** in which I learnt all the relevant codes of professional practice and how to apply them in my own professional work.

**2. Health Behaviour Change Interventions:** in which I learnt how to design, assess, formulate, provide and evaluate health behaviour change interventions.

**3. Consultancy Skills in Health Psychology:** where I developed skills to successfully negotiate, undertake, evaluate and report consultancy work in a health psychology setting.

**4. Teaching and Training in Health Psychology:** where I developed the skills to assess the training needs of teaching groups, designed teaching curriculum and content, delivered teaching content and evaluated the effectiveness of teaching and training.

**5. Research:** where I learnt how to conceptualise, design, and implement a research study in health psychology. This included data collection, data analysis, evaluation of methods, discussion of implications of the data in contributing to the development of new ideas and techniques, and the relationship of data to previously published research.

The **Research** competency was assessed in two parts: Part 1 involved designing, conducting and reporting a **Systematic Review**. This **Systematic Review** has been completed, submitted, assessed and passed by the University of the West of England and BPS examination board in February 2013.

Part 2 of the Research Competency involved conducting an **empirical research study** in a topic relevant to Health Psychology. The research thesis should be more ambitious than would normally be undertaken for completion of an MSc thesis but less ambitious than a PhD thesis. This doctoral thesis describes the **Research Study** which I conducted as Part 2 of the **Research** competency.

Portfolios for all the other doctorate competencies have been submitted, assessed and passed from 2013 – 2015.

### **Research Thesis Summary**

This *doctoral research thesis* investigates *body image inflexibility* in relation to *disordered eating*. It tests an adapted version of the Tripartite Influence Model (with the inclusion of body image inflexibility) to investigate disordered eating with adult women (Thompson, Heinberg, Altabe & Tantleff-Dunn, 1999). Around 60% of women regularly engage in disordered eating behaviours (Tylka & Subich, 2002). Disordered eating is therefore highly prevalent compared to the rates of diagnosed eating disorders (5% for anorexia, 1-3% for bulimia and 2-5% for other forms of eating disorder) (Micali, Hagberg, Petersen & Treasure, 2013; Mintz & Betz, 1988; Mulholland & Mintz, 2001; Tylka & Subich, 2002). Disordered eating has been defined as eating in response to emotional or situational cues and being preoccupied with food and dieting (Denny, Loth, Eisenberg & Neumark-Sztainer, 2013). It shares many of the behaviours associated with formal eating disorders such as engaging in extreme weight control behaviours such as fasting and vomiting after eating and using appetite suppressants or diuretics (Mintz & Betz, 1988). However disordered eating behaviours are less frequent or severe as those associated with

diagnosed eating disorders (Diagnostic and Statistical Manual of Mental Disorders 4<sup>th</sup> Edition (DSM-IV-Text Revision)).

Women have been found to report significantly different disordered eating attitudes and behaviours compared to men (Furnham, Badmin & Sneade, 2002; Furnham & Calnan, 1998). For example women are more likely to engage in fasting, purging and diet pill use compared to men (Anderson & Bulik, 2004; Forrester-Knauss & Stutz, 2012; Gadalla, 2009; Grucza, Przybeck, & Cloninger, 2007; Guidi et al., 2009; Hudson, et al, 2007; Kashubeck-West, Mintz & Weigold, 2005; Neumark-Sztainer, et al, 2011; Striegel-Moore et al., 2009; Weltzin et al, 2005). Amongst women, disordered eating is pervasive across the female lifespan, with middle aged women reporting similar levels of disordered eating compared to their younger counter parts (Mangweth-Matzek, et al, 2009; McLaren & Kuh, 2004; Perez, Hernandez, Clarke & Joiner, 2007; Procopio, Holm-Denoma, Gordon & Joiner, 2006). Disordered eating also has been associated with a range of negative health outcomes such as being a risk factor for the development of diagnosable eating disorders and for the onset of obesity (Neumark-Sztainer, et al, 2006; Stice et al, 1999). A number of physical health problems are also associated with disordered eating including dehydration, gastric rupture, chronic irregular bowel movements and tooth decay (National Eating Disorders Association, 2015). Due to the pervasive nature of disordered eating across the female lifespan and the significant gender differences identified in disordered eating attitudes and behaviours, is important to investigate patterns of disordered eating in women separately to men. This thesis therefore investigated disordered eating behaviours in a female population only.

Considering the high prevalence of disordered eating and the significant impact on women's health, it seems imperative for research to identify the key factors that influences disordered eating for women. A theoretical model of disordered eating that had gained much support with adult female populations is the Tripartite Influence Model (Thompson,

Heinberg, Altabe & Tantleff-Dunn, 1999). This model postulates that there are three main sociocultural influences on body image and disordered eating: pressures to be thin from the media, peers and parents. These three sources of sociocultural pressure to be thin influence body image through two mediating variables: *internalisation of the thin ideal* (i.e. when women internalise thin-ideal messages and develop the belief that they need to be thin in order to be successful in their lives) and *upward appearance comparisons* (i.e. when women compares their own appearance with that of someone they deem as more attractive) (Smolak, Levine & Schermer, 1999). Increased levels of body image dissatisfaction then leads to disordered eating. A range of studies have provided support for this model with adult women (Huxley, Halliwell & Clarke, 2014; Johnson, Edwards & Gidycz, 2014; Rodgers, Chabrol, & Paxton, 2011; Van den Berg, Thompson, Obremski-Brandon & Covert, 2002; Yamamiya, Shroff & Thompson, 2008). However a limitation of the Tripartite Influence Model is that the influencing variables outlined in the model only relate to the *content* of negative disordered eating and body image-related cognitions.

Recent research has found that other factors such as emotion/behaviour regulation processes (i.e. how an individual *processes* negative disordered eating and body image related thoughts) are also important for influencing disordered eating behaviours (Callaghan, Sandoz, Darrow & Feeney, 2015; Sandoz, Wilson, Merwin, & Kellum, 2013; Ferreria, Palmeria & Trindade, 2014). A review of the literature (p16) has indicated that research is now increasingly focusing on measuring emotion/behaviour regulation processes, in addition to more traditional constructs which measure the actual *content* of negative body image-related cognitions (e.g. body image dissatisfaction) when investigating disordered eating. One particular emotion/behaviour regulation construct that has gained momentum is body image-related psychological inflexibility (which for brevity will be referred to as body image inflexibility throughout this thesis). This is a regulation tendency to rigidly attempt to



control or avoid unwanted body image-related psychological experiences, in order to avoid the associated distress (Sandoz et al, 2013). Alternatively, individuals who have body image flexibility are able to experience difficult thoughts and feelings about one's body without attempting to change their intensity, frequency or form, while pursuing affective actions in relation to other life areas (Sandoz, et al., 2013). Research indicates that body image inflexibility has a significant and positive relationship with disordered eating and also with a number of disordered eating risk factors such as body image, internalisation of the thin ideal and upward appearance comparisons (Callaghan, et al, 2015; Ferreira, et al, 2014; Hill, Masuda & Latzman, 2013; Masuda, Boone & Timko, 2011; Sandoz, et al, 2013; Timko et al, 2014; Wendell et al, 2012).

Previous research has suggested that body image inflexibility has been found to have a mediating role with two key variables outlined in the Tripartite Influence Model: body image dissatisfaction and upward appearance comparisons (Ferreira, et al, 2014; Hill et al, 2013; Masuda et al, 2011; Sandoz, et al, 2013; Timko et al, 2014; Wendell et al, 2012). For example body image inflexibility has been found to mediate the relationship between negative body image and disordered eating and between upward appearance comparison and disordered eating. These findings indicate that both body image dissatisfaction and upward social comparisons can lead to higher levels of body image inflexibility, which can then lead to increased levels of disordered eating. Given its central mediating role identified in previous research, the current study placed body image inflexibility in a similar position within the Tripartite Influence Model. Body image inflexibility was therefore investigated as a mediator within the Tripartite Influence Model to determine whether body image inflexibility could account for the influences from the interpersonal variables (i.e. sociocultural pressures to be thin) and intrapersonal variables (i.e. internalisation of the thin ideal, upward appearance comparisons and body image) and disordered eating.

Upward appearance comparison was not included in the model in the current study. Therefore the sociocultural pressures were hypothesised to influence body image through internalisation of the thin ideal alone. For example it might be the case that the sources of pressure to be thin lead to increases in internalisation of the thin ideal, which increases negative body image. Negative body image then leads to more rigid and inflexible body image-related cognitions and behaviours (i.e. body image inflexibility). Body image inflexibility then increases the likelihood of disordered eating. For example, when women become preoccupied with difficult body image-related thoughts and feelings, they might engage in disordered eating as a way of attempting to change their body size, in order to gain relief from these unpleasant internal experiences.

The aims of this research study were to investigate whether body image inflexibility would mediate the established relationships of the predictor and outcome variables within the Tripartite Influence Model such as the relationship between *body image* and *disordered eating* and the relationship between *internalisation of the thin ideal* and *disordered eating*.

This doctorate thesis is written according to the BPS Health Psychology Stage 2 Handbook and in line with the Doctoral Descriptors for the University of the West of England. *For clarity, when relevant doctoral descriptors are discussed within the thesis, the text is in bold and italic font.*

## **Systematic Review**

The design for this thesis research study was also influenced by the systematic review that was conducted for Part 1 of the assessment in the **Research** competency. This systematic review investigated the effectiveness of acceptance-based interventions for improving body image in adults. Acceptance-based psychological interventions are based on the principles

of Acceptance and Commitment Therapy (ACT) which aim to increase levels of psychological flexibility. Please see *Appendix A* for a copy of this systematic review.

The systematic review was completed during the first academic year of the Professional Doctorate (2012 - 2013). The results showed that overall six individual studies were relevant to be included in the systematic review. Each study reported satisfactory results, with all acceptance-based interventions significantly improving body image compared to control. However the quality of methods varied and sample sizes were small. Nonetheless, the systematic review identified initial evidence supporting the effectiveness of acceptance-based interventions for improving body image in adults.

As part of the review, process variables (identified as predicting the intervention effects in the reviewed papers) were also investigated. Of the three papers which measured process variables, all three studies found that improvements in weight related-psychological flexibility significantly mediated the improvements in body image outcomes. Body image is one of the key risk factors for the development of disordered eating (Stice, 2002). Therefore these findings provided further evidence of the importance of investigating the role of body image inflexibility for disordered eating, within this doctoral research thesis.

## **Declaration of contributions**

All aspects of this research thesis were Catrin Griffiths' own work.

Catrin Griffiths provided the initial idea for this investigation and conducted the research study design, participant recruitment, data analysis and write up of results.

Catrin Griffiths received appropriate supervision from Dr Tim Moss and Professor Nichola Rumsey throughout the investigation.

## **Research Thesis**

**TITLE: THE ROLE OF PSYCHOLOGICAL INFLEXIBILITY IN THE TRIPARTITE INFLUENCE MODEL FOR WOMEN: A SINGLE BODY IMAGE INFLEXIBILITY PATHWAY TO DISORDERED EATING BEHAVIOURS**

## **Abstract**

This study was conducted by conceptualising, designing and implementing new knowledge at the forefront of body image inflexibility (a construct derived from Acceptance and Commitment Therapy (ACT)) and disordered eating. The study design was adjusted in the light of emergent issues and understandings. The thesis involved a review of the literature which investigated disordered eating and the factors known to influence disordered eating such as body image inflexibility. A critical understanding of the current state of knowledge in this field of theory and practice has been provided. Overall the literature review suggested that body image inflexibility is an important factor to examine when investigating the predictors of disordered eating behaviours.

The current study involved the creation and interpretation of new knowledge through original research and advanced scholarship by using a quantitative online survey and latent structural equation modelling (SEM) to test an adapted version of the Tripartite Influence Model with the inclusion of body image inflexibility with 378 adult women. In the method, the range of study design methods and statistical analyses that were considered for this study were outlined. A rationale was provided for the chosen study design and statistical analysis, in order to demonstrate a critical understanding of the methodology of enquiry.

The results identified that body image inflexibility represented a single pathway which fully mediated the relationship between women's body image and their engagement in disordered eating behaviours. Body image inflexibility also fully mediated the relationships between internalisation of the thin ideal and disordered eating and between friend pressure and disordered eating. Perceived pressure to be thin from friends, partners,

family and the media also had distinct relationships in the model. Perceived pressure from friends was significantly related to body image inflexibility. Both pressure from partners and pressure from the media had direct relationships with internalisation of the thin ideal and also with disordered eating behaviours. Pressure from family had a direct relationship with body image. Internalisation of the thin ideal and body image had significant mediational roles in the model. Internalisation of the thin ideal fully mediated the relationship from partner pressure to body image inflexibility, from media pressure to body image inflexibility and from partner pressure to body image. Internalisation of the thin ideal partially mediated the relationship between media pressure and body image. Body image fully mediated the relationships between media pressure and body image inflexibility, and between family pressure and body image inflexibility. Body image partially mediated the relationship between internalisation of the thin ideal and body image inflexibility.

The results have highlighted the importance of including body image inflexibility as a mediating variable in theoretical models of disordered eating and as a psychological construct to target in treatment interventions for disordered eating. In the discussion, an independent judgement of issues and ideas within the field of disordered eating and psychological flexibility research and practice was provided. Finally a critical reflection on the current study and its strengths and weaknesses was then outlined.

## **1. Literature review**

*A literature review of the area will now be outlined to demonstrate a critical understanding of the current state of knowledge in the field of disordered eating and body image inflexibility.*

### **1.1. What is disordered eating?**

Around 60% of women regularly engage in disordered eating behaviours (Tylka & Subich, 2002). Disordered eating is therefore highly prevalent compared to the rates of diagnosed eating disorders (5% for anorexia, 1-3% for bulimia and 2-5% for other forms of eating disorder) (Micali, Hagberg, Petersen & Treasure, 2013; Mintz & Betz, 1988; Mulholland & Mintz, 2001; Tylka & Subich, 2002). Disordered eating has been defined as eating in response to emotional or situational cues and being preoccupied with food and dieting (Denny, Loth, Eisenberg & Neumark-Sztainer, 2013). This is the direct opposite of intuitive eating which describes a healthy relationship with food that involves eating in response to physiological hunger and satiety cues (Augustus-Horvath & Tylka, 2011). Disordered eating shares many of the behaviours associated with formal eating disorders such as engaging in extreme weight control behaviours such as fasting and vomiting after eating and using appetite suppressants or diuretics (Mintz & Betz, 1988). However disordered eating behaviours are less frequent or severe as those associated with formal eating disorders (Diagnostic and Statistical Manual of Mental Disorders 4<sup>th</sup> Edition (DSM-IV-Text Revision)).

Disordered eating has also been associated with a number of health problems. For example, those who engage in disordered eating have an increased likelihood of developing a diagnosable eating disorder (Patton, et al, 1999). Also despite the weight loss intentions of



those who engage in disordered eating, research indicates that disordered eating is associated with unintentional weight gain in the long term and is a risk factor for the onset of obesity (Neumark-Sztainer, et al, 2006; Stice et al, 1999). Disordered eating is also associated with a range of physical health problems such as dehydration, gastric or oesophagus rupture during periods of bingeing, peptic ulcers and pancreatitis and tooth decay from stomach acids released during vomiting. In addition to chronic irregular bowel movements and constipation as a result of laxative abuse, high blood pressure and cholesterol levels, heart disease, type II diabetes mellitus, gallbladder disease and electrolyte imbalances that can lead to irregular heartbeats (National Eating Disorders Association, 2015). Other risky health behaviours such as unprotected sex, drug use and suicide attempts have also been associated with disordered eating (Neumark-Sztainer, Story & French, 1996). Due to the high prevalence of disordered eating across the female lifespan and its significant impact on women's health, researchers and clinicians are increasingly drawing their attention to interventions which target the entire spectrum of disordered eating. Rather than treating just those with clinically identifiable eating disorders (Hotelling, 2001). Identifying the key factors which influence disordered eating is therefore vital in order to provide effective prevention and treatment interventions.

## **1.2. Body image and disordered eating**

Body image is one of the key risk factors for the development of disordered eating (Stice, 2002). Body image is defined as “one's perceptions and attitudes in relation to one's own physical characteristics” (Cash & Fleming, 2002, p 455). It includes both negative and positive features and consists of a number of components, usually described as cognitive,

affective, behavioural and perceptual (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999).

Negative body image is generally assessed using measures of body image dissatisfaction. Body image dissatisfaction is defined as “negative subjective evaluations of one’s physical body” (Stice & Shaw, 2002, p. 985). Body image dissatisfaction is highly prevalent with around 61 – 82% of women reporting dissatisfaction with the way they look (Harris & Carr, 2001; Lioffi, 2003). Body image dissatisfaction is also one of the most robust risk factors for disordered eating (Stice, 2002). Amongst women, body image dissatisfaction has been found to remain stable across the adult lifespan (Tiggemann & Lynch, 2001; Tiggemann, 2004). Both younger and middle aged women report similar levels of body image dissatisfaction and it remains a strong predictor of disordered eating behaviours across the female lifespan (Hrabosky & Grilo, 2007; Mangweth-Matzek, et al, 2009; McLaren & Kuh, 2004; McLean, Paxton, & Wertheim, 2009; Marcus, Bromberger, Wei, Brown & Kravitz, 2007; Midlarsky & Nitzburg, 2008; Perez, Hernandez, Clarke & Joiner, 2007; Procopio, Holm-Denoma, Gordon & Joiner, 2006; Stice, 2002).

Positive body image is another aspect of body image which has been found to be significantly associated with eating behaviours (Augustus-Horvath & Tylka, 2011; Avalos & Tylka, 2006; Iannantuono & Tylka, 2012). Positive body image is a distinct construct that is not simply low levels of negative body image (Tylka & Wood-Barcalow, 2015a). Positive body image has been defined as having positive embodiment, or experiencing and using the body in healthy ways, such as having body functionality and body appreciation. (Tylka & Homan, 2015; Tylka & Wood-Barcalow, 2015b). Women who report high levels of body functionality tend to focus more on what their body can do and how it feels, as opposed to what their body looks like (Augustus-Horvath & Tylka, 2011; Tylka & Homan, 2015). Body appreciation involves “holding favourable opinions toward the body, accepting the body

regardless of appearance, respecting the body by engaging in healthy behaviors, and protecting the body by rejecting unrealistic media appearance ideals” (p.91, Tylka & Homan, 2015; Avalos et al., 2005). Therefore measures of positive body image go beyond just measuring body image evaluation by including body functionality and positive embodiment (Tylka & Homan, 2015).

Recent research has found a relationship between body appreciation and eating behaviour (Augustus-Horvath & Tylka, 2011; Avalos & Tylka, 2006; Iannantuono & Tylka, 2012). For example, body appreciation has been found to positively predict intuitive eating (i.e. eating in response to physiological hunger and satiety cues) (Augustus-Horvath & Tylka, 2011; Avalos & Tylka, 2006; Iannantuono & Tylka, 2012). Intuitive eating is inversely related to disordered eating behaviours (Denny, Loth, Eisenberg & Neumark-Sztainer, 2013). From these findings it might be inferred that those lacking in body appreciation might be more likely to engage in disordered eating behaviours. Accordingly, recent research has highlighted the importance of including body appreciation within models of body image and eating behaviour (Tykla, 2011a).

### **1.3. Gender differences in disordered eating**

Gender is a key factor that should be considered when investigating disordered eating behaviours. A number of studies have found that women report significantly greater levels of disordered eating behaviours compared to men (Keel, Baxter, Heatherton & Joiner, 2007; Liechty & Lee, 2013; Markey & Markey, 2005; Neumark-Sztainer, et al, 2011). Research also indicates that this trend persists throughout the lifespan. For example, a 10 year longitudinal study found that throughout childhood, adolescence and adulthood, disordered eating behaviors and attitudes were significantly more prevalent among women than men

(Neumark-Sztainer, et al, 2011). Other longitudinal studies have shown similar results (Heatherton et al, 1997; Keel, et al, 2007; Kotler, et al, 2001; Liechty & Lee, 2013).

This is not to imply that men are unaffected by disordered eating. On the contrary a number of studies indicate that men report significant disordered eating behaviours (Tylka, 2011b; Tylka & Andorka, 2012). However there appears to be significant gender differences in disordered eating behaviors and attitudes. For example research indicates that women are more likely to engage in a greater number of disordered eating behaviours such as fasting, purging and diet/laxative pill use compared to men (Anderson & Bulik, 2004; Gadalla, 2009; Hudson, et al, 2007; Kashubeck-West, Mintz & Weigold, 2005; Lewinsohn, Seeley, Moerk & Striegel-Moore, 2002; Neumark-Sztainer, et al, 2011; Striegel-Moore et al., 2009; Weltzin et al, 2005). However women are equally likely (or less likely) than men to report binge eating or exercising excessively (Anderson & Bulik, 2004; Forrester-Knauss & Stutz, 2012; Gadalla, 2009; Gruzca, Przybeck, & Cloninger, 2007; Guidi et al., 2009; Hudson, et al, 2007; Kashubeck-West, Mintz & Weigold, 2005; Lundahl, et al, 2015; Neumark-Sztainer, et al, 2011; Striegel-Moore et al., 2009; Weltzin et al, 2005). Other research has found that although women report higher rates of disordered eating, the rate of disordered eating amongst men is more persistent over time (Keel, et al, 2007).

These gender differences in eating behaviours are likely to be influenced by the different body image pressures and concerns that women and men experience (Furnham, et al, 2002). For instance, women report significantly higher levels of pressure to be thin (i.e. from the media, friends, peers or family) compared to men (Miller & Halberstadt, 2005; Klein, Brown, Kennedy & Keel, 2016). Also the majority of women wish to lose weight and very few want to gain weight (Furnham et al, 2002; Silberstein, et al, 1988). Whereas body image concerns in men are not as straightforward. A number of studies have found that men are about evenly split with some men wishing to lose weight, whereas others wanting a

larger, more muscular body, and wished to gain weight (Cafri, van den Berg & Thompson, 2006; Drewnowski, Kurth & Krahn, 1995; Furnham, Badmin & Sneade, 2002; Hildebrandt, Schlundt, Langenbucher, & Chung, 2006; McCreary & Sasse, 2000; McFarland & Kaminski, 2009; Silberstein, Striegel-Moore, Timko, & Rodin, 1988). However, despite some men wanting to lose weight, they generally do not wish to be thin or scrawny (Ridgeway & Tylka, 2005).

Gender differences have also been identified in the way women and men perceive their own bodies (Furnham & Calnan, 1998). For example, women have been found to place higher levels of importance on the attractiveness of their body compared to men (Oberg & Tornstam, 1999). Women have also been found more likely to perceive themselves as overweight when objective ratings do not indicate this. Conversely men are more likely to perceive themselves as underweight in comparison to objective ratings (Furnham & Calnan, 1998). Additionally research suggests that most underweight women are satisfied with their bodies, whereas underweight men are more likely to be dissatisfied with their bodies (Cash, Winstead & Janda, 1986). These findings suggest that being underweight appears to have a different more positive meaning for women compared to men. Therefore this might put women at a higher risk of engaging in disordered eating behaviours.

These differences in body image perceptions are likely to be influenced by the gender differences in the body figure ideals that women and men aspire to look like. The female ideal is to be extremely thin, particularly in relation to having slim hips, thighs and bottom (Anderson & Di Domencio, 1992). Yet for most women to achieve this extremely thin and unrealistic body figure, they are required to engage in unhealthy disordered eating behaviours such as food restriction and purging (Brownell, 1991). For men, the ideal body is a lean V-shaped figure with large biceps, chest and shoulders (Furnham et al, 2002). While the male ideal body requires men to be lean, it also requires men to be more muscular than

what is realistic for an average man (Tylka, 2011b; Tylka & Andorka, 2012). This male ideal influences men to have a greater drive for muscularity and weight gain in order to gain additional muscle, while at the same time also losing weight to be lean. This encourages men to engage in behaviours such as rigorous exercise and weight training, rather than just dieting behaviours. These differences in body image ideals may help explain the gender differences in disordered eating behaviours identified in previous research. Due to the significant gender differences identified in disordered eating attitudes and behaviours, it is therefore important to investigate women separately to men to ensure that gender specific processes are fully accounted for when identifying the key variables that influence disordered eating. Therefore this thesis will investigate disordered eating in women only.

#### **1.4. Theoretical models of disordered eating**

A great deal of research has investigated the factors that contribute to the development and maintenance of disordered eating behaviours (Stice, 2002; Rohde, Stice & Marti, 2015). A range of social, cultural, biological and interpersonal factors have been identified as potential causal factors such as negative body image, low self-esteem, pressure to be thin from the media, family, friends and partners, internalisation of the thin ideal, high levels of upward appearance comparisons, and negative affect (Stice, 2002; Rohde, Stice & Marti, 2015). Theoretical models of disordered eating are useful for understanding how a number of these key factors work together to influence disordered eating. The most common type of theoretical models used to explain how social and cultural factors influence body image and disordered eating are sociocultural models (Huxley et al, 2014).

A number of different sociocultural models of disordered eating were considered for inclusion in the current study. The first model that was considered was the Dual Pathway

Model of Bulimia (Stice, Shaw & Nemeroff, 1998). This model outlines a number of factors that contribute to bulimia symptoms: internalisation of the ideal, body mass, body image dissatisfaction, dietary restraint, perceived pressure to be thin, and negative affect. The model proposes that increased body mass results in greater body image dissatisfaction which increases perceived pressure to be thin i.e. the pressure an individual perceives from others such as friends, family, partners and the media to have a thin body . This increase in pressures to be thin also increases levels of body image dissatisfaction. Internalisation of the thin ideal (i.e. when an individual internalises the thin ideal body figure and makes it their personal standard) also increases body image dissatisfaction. Body image dissatisfaction then influences the engagement of restrained eating (i.e. the conscious control of food intake) and negative affect which then leads to bulimic symptoms.

There are a number of studies that provide support for the Dual Pathway Model of Bulimia model for predicting bulimic symptoms in adult women (Shepherd & Ricciardelli, 1998; Stice, Ziemba, Margolis & Flick, 1996; Stice, Shaw & Nemeroff, 1998). However, this model groups the different types of perceived pressure to be thin (e.g. from family, friends, partner and media) into one variable. Research indicates that these different sources of pressure can have very different relationships with disordered eating and its related risk factors (Huxley, et al, 2014; Johnson, Edwards & Gidycz, 2014; Rodgers, Chabrol, & Paxton, 2011; Van den Berg, Thompson, Obremski-Brandon & Covert, 2002; Yamamiya, Shroff & Thompson, 2008). Therefore grouping these different pressures into one variable limits the ability to investigate how the individual sources of pressure influence disordered eating. Sociocultural models which include the different sources of pressure as distinct factors might therefore be more useful when exploring the influences of disordered eating. It was therefore identified that the Dual Pathway Model of Bulimia was not appropriate for use in the current study.

The second theoretical model of disordered eating that was considered in the current study was the Objectification Theory (Fredrickson & Roberts, 1997). This model posits that through life experiences and gender socialisation, girls and women frequently experience sexual objectification. Sexual objectification occurs when a woman's body is treated as an object, often for the pleasure and use of others (Fredrickson & Roberts, 1997; Slater & Tiggeman, 2002). This is exhibited in the representation of women in the media and socially and interpersonally when women are 'checked out' by others. This objectification is so prevalent in society that it leads girls and women to engage in self-objectification. This describes the internalisation of these opinions. For example, girls and women may begin to view themselves in the same way as women are represented in the media, as an object to be looked at and evaluated based on appearance (Slater & Tiggeman, 2002). Self-objectification is argued to lead women to habitually monitor their appearance, leading to feelings of shame and appearance-related anxiety. It can also reduce opportunities for peak motivational states or 'flow' of consciousness. For example, when a woman's conscious attention is disrupted with thoughts and feelings about her appearance, rather than focusing on more meaningful mental or physical activities which are enjoyable and rewarding (Fredrickson & Robertson, 1997). Self-objectification also reduces the perceptual resources for attending to inner body experiences and reduces awareness of internal body states. These negative experiences are then thought to lead women to engage in disordered eating, as a way of attempting to change their bodies in an attempt to look more like the thin ideal which society has objectified. A number of studies have provided support for the Objectification Theory of disordered eating with adult women (Augustus-Horvath & Tylka, 2009; Tiggemann & Slater, 2001; Tylka & Hill, 2004). However a limitation of these studies is that the evidence is based on cross-sectional data. This type of data can be useful for identifying important correlations between variables, however it is not possible to ascertain causation using cross sectional data.



Another limitation of the Objectification Theory (as with the Dual Pathway Model of Bulimia) is that the model does not include the individual sociocultural pressures to be thin from the media, friends, family and partners. These variables have been identified as key factors for influencing disordered eating (Stice, 2002). Therefore the Objectification Theory was deemed as unsuitable for use in the current study.

### **1.5. The Tripartite Influence Model of Body Image and Disordered Eating**

The Tripartite Influence Model of body image and disordered eating was the final theoretical model considered for the current study (Thompson, et al, 1999) (See Figure 1). The Tripartite Influence Model postulates that there are three main influences on body image and disordered eating: pressures from the media, peers and parents. In Western society, the media frequently projects the view that a thin body with little body fat is both desirable and achievable for women (i.e. media pressure to be thin) (Slevec & Tiggemann, 2011b). Similarly, women can also experience peer pressure and parent pressure to be thin in which peers or parents make comments or behave in ways that perpetuate the thin ideal (e.g. encouraging women to diet, making negative comments about weight or shape or giving complements to a woman when she has lost weight). However, for the average woman, the thin ideal is hard to achieve without engaging in unhealthy weight loss behaviours such as fasting, purging or diet pill use (Brownell, 1991). These three sources of sociocultural pressure to be thin (i.e. media pressure, peer pressure and parent pressure) influence body image and disordered eating through two mediating variables: *internalisation of the thin ideal* (i.e. when women internalise thin-ideal messages and develop the belief that they need to be thin and beautiful in order to be successful in their lives) and *upward appearance comparisons* (i.e. when women compares their own appearance with that of someone they deem as more attractive) (Smolak, Levine & Schermer, 1999).

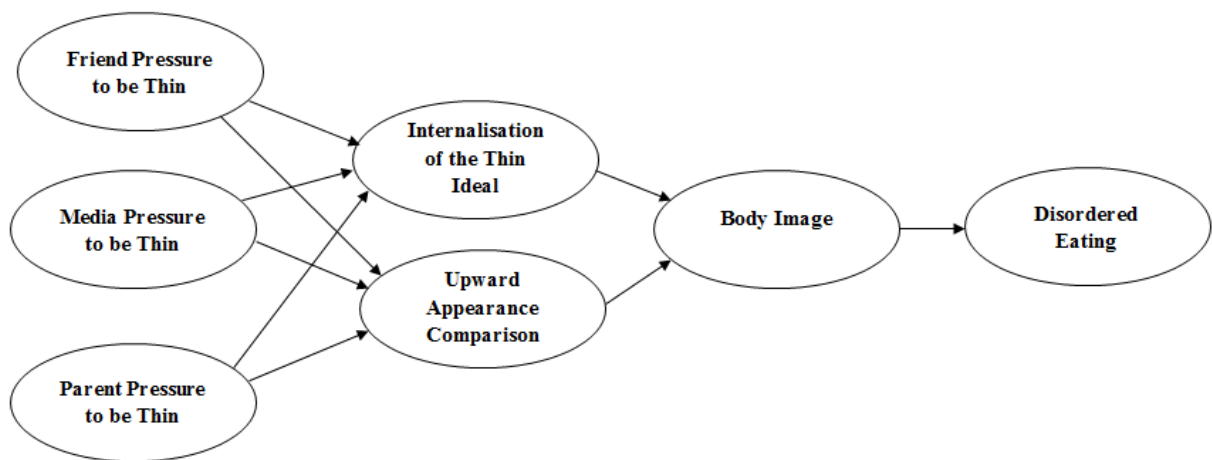


Figure 1. The Tripartite Influence Model of Body Image and Disordered Eating

A number of studies provide support for the Tripartite Influence Model with adult women (Huxley, et al, 2014; Johnson, Edwards & Gidycz, 2014; Lewis-Smith, Diedrichs, Bond, Rumsey & Harcourt, 2016; Rodgers, Chabrol, & Paxton, 2011; Van den Berg, Thompson, Obremski-Brandon & Covert, 2002; Yamamiya, Shroff & Thompson, 2008). However when the model has been tested with adult women, a number of amendments have often been made to the model. For example, an additional source of pressure to be thin from dating partners is often included in the model (Huxley, et al, 2014; Johnson, et al 2014; Rodgers, et al, 2011; Van den Berg, et al, 2002). As an individual reaches adulthood, they are likely to spend more time with romantic partners and are therefore at risk of experiencing further pressure to be thin from their partners (Thompson et al, 1999). Similarly, in some adult studies, the parent pressure variable has been broadened to family pressure (e.g. I feel pressure from family members to have a thin body). This is because adult women may have a greater range of potential family members (e.g. their own children, in addition to parents

or siblings) that they may experience pressure from to be thin (Huxley, et al, 2014; Johnson, et al, 2014; Van den Berg, et al, 2002).

There is evidence for the Tripartite Influence Model with adult women across the lifespan, which includes samples of university undergraduate students, women aged in their 30s, as well as those in their midlife (which the authors define as aged 35 onwards) (Huxley et al, 2014; Johnson, et al, 2014; Lewis-Smith, et al, 2016; Rodgers, et al, 2011; Slevic & Tiggemann, 2011a; Van den Berg, et al, 2002; Yamamiya, et al, 2008). An overview of the studies which have tested the Tripartite Influence Model with adult women will now be outlined.

Four studies have involved university undergraduate women (Johnson, et al, 2014; Rodgers, et al, 2011; Van den Berg, et al, 2002; Yamamiya, et al, 2008). Rodgers et al (2011) tested the original Tripartite Influence Model (without pressures from dating partners), with 188 Australian (mean age=19.6) and 190 French (mean age=20.7) undergraduate students. Path analysis found that the Tripartite Influence Model was a good fit in both samples; however there were similarities and differences in the model pathways between the different samples. In the Australian sample, the direct path from parent pressure to internalisation of the thin ideal, from parent pressure to upward appearance comparison and from peer pressure to internalisation were not significant. Also two new pathways were found to be significant: a direct path from peer pressure to body dissatisfaction and a direct path from peer pressure to bulimic behaviours. In the French sample, the pathways from parent pressure to internalisation, from peer pressure to internalisation and from peer pressure to upward appearance comparison were not significant. Also one new direct path from peer pressure to body image dissatisfaction was identified. However a limitation of this study is the relatively small sample size for path analysis which reduces the reliability of the findings.

Yamamiya et al's (2008) study provided further support for the original Tripartite Influence Model (e.g. not including dating partners) and involved 289 Japanese female undergraduates (mean age= 19.9). However the pathways from peer pressure to internalisation and from media pressure to upward appearance comparison were not significant. Two additional pathways from internalisation of the thin ideal to upward appearance comparison and from internalisation of the thin ideal to disordered eating were also found to be significant. All other pathways outlined in the original Tripartite Influence Model were found to be significant. A limitation of this study is that it did not include dating partner pressure, which is often assessed when this model is tested with adult women.

Van den Berg, et al's (2002) study involved 196 American female undergraduates (mean age=19.5) and also provided support for the Tripartite Influence model. However the authors did not include internalisation of the thin ideal in their model. Instead the sociocultural pressures influenced body image and disordered eating through upward appearance comparison only. The results showed support for the Tripartite Influence Model variables and pathways. Also an additional pathway from peer pressure to disordered eating was identified as significant. However a limitation of this study related to the questions that were used to measure family pressures to be thin. The questions asked participants to report retrospective pressure that they had experienced when they were adolescents, rather than family pressures to be thin that were currently being experienced. Retrospective accounts are likely to lack validity since memory for past information is likely to be distorted.

The final study that has provided evidence for the Tripartite Influence Model with undergraduate women involved 246 American undergraduate students (mean age=18.74) (Johnson et al, 2015). This study was limited since upward appearance comparisons were not included in the model. However all other pathways outlined in the original model were supported.

Research also indicates that the Tripartite Influence Model is relevant to women aged in their 30s and older. For example, a study by Huxley et al (2014) found support for the Tripartite Influence Model for adult women aged in their 30s (Huxley, et al, 2014). This study tested an adapted Tripartite Influence Model (with the inclusion of dating partner pressure) with 264 heterosexual and 208 lesbian and bisexual adult women (mean age= 32.78). The adapted model that was tested did not include upward appearance comparisons. Overall the results showed support for the model with both groups of women. However for both groups of women, family pressure was not significantly related to internalisation of the thin ideal, instead family pressure had a significant direct pathway to weight satisfaction. Friend pressure did not have a significant role in the model for either group of women. Also internalisation of the thin ideal had a direct pathway to disordered eating. For heterosexual women there were additional significant pathways identified: family pressure and male romantic partner pressure were directly related to restrained eating and media pressure was directly related to weight satisfaction. However a limitation of this study was that the model tested did not include upward appearance comparisons.

There is also evidence for the Tripartite Influence Model with women in their midlife (Lewis-Smith, et al, 2016; Slevec & Tiggemann, 2011a). Lewis-Smith, et al (2016) tested an adapted Tripartite Influence Model (with the addition of partner pressure) with 323 women in their midlife (mean age= 47.6). The results showed support for many of the variables and pathways outlined in the model. However a number of additional pathways were identified: media pressure had a direct effect on body image and an indirect effect on body image, through internalisation of the thin ideal and appearance comparisons. There were also significant pathways from family pressure and friend pressure to body image. However partner pressure was not found to be significant in the model. This suggests that partner pressure might not be as salient in influencing body image for women in their midlife.

A limitation of this study is that it did not include a measure of disordered eating, since measuring disordered eating was beyond the aims of the study. Therefore it is unclear how the findings relate to disordered eating.

Slevec and Tiggemann (2011a) also tested an adapted version of the Tripartite Influence Model with 101 women in their midlife (mean age= 44.26). However the only sociocultural pressure that was included in the model was media pressure. The results found that magazine exposure was positively related to body image dissatisfaction and disordered eating but TV exposure was not. TV and magazine exposure was positively related to internalisation of the thin ideal and social comparison and all of these variables were positively related to body image dissatisfaction and disordered eating. However a limitation of this study is that the other sources of sociocultural pressures to be thin (i.e. friend pressure, family/parent pressure and dating partner pressure) were not tested in the model.

A limitation of all the previously discussed studies in support of the Tripartite Influence Model is the use of cross-sectional data. This type of data limits the ability to make causal inferences about the relationships in the model. Testing the Tripartite Influence Model with longitudinal data would allow more robust causal assumptions to be made. No research to date has tested the full Tripartite Influence Model with adult women using longitudinal data. However two longitudinal studies have tested specific elements of the model with adult women and school-aged girls (McCabe, Ricciardelli and James, 2007; Rodgers, McLean & Paxton, 2015).

A longitudinal study by McCabe, et al (2007) tested the relationships between media pressure to be thin, body image and disordered eating and involved 157 women who regularly attended fitness centres (mean age=35.31). Participants completed measures at two time points which were 12 months apart. The results identified that body image significantly

predicted disordered eating. Media pressure also significantly predicted disordered eating. These results show support for the key relationship between body image and disordered eating outlined in the Tripartite Influence Model using longitudinal data. The findings also identified an additional relationship between media pressure and disordered eating that is not in the original Tripartite Influence Model. However a limitation of this study is that no other relationships from the Tripartite Influence model were tested.

A further longitudinal study conducted by Rodgers, McLean & Paxton (2015) tested the relationships between internalisation of the thin ideal, upward appearance comparison and body image with school-aged girls (mean age = 12.77 years). Participants completed psychometric measures at baseline, 8 months and 14 months. Overall the results showed support for some of the key risk factor relationships outlined in the Tripartite Influence model. Baseline internalisation of the thin ideal was found to significantly predict body image at 8 months. Upward appearance comparison at 8 months significantly predicted body image at 14 months. Also additional pathways were identified that were not outlined in the original Tripartite Influence Model. For example, baseline internalisation of the thin ideal was found to significantly predict upward appearance comparison at 8 months. Also a reciprocal effect was identified with body image at 8 months predicting internalisation of the media ideal at 14 months. These results provide support for some of the key relationships outlined in the Tripartite Influence model such as the relationships between internalisation of the thin ideal and body image and between upward social comparison and body image. The results also suggest that additional pathways from internalisation of the thin ideal to upward appearance comparison and a reciprocal path from body image to internalisation of the thin ideal could be added to models that test the Tripartite Influence model in the future. A limitation of this study is that disordered eating behaviours were not measured and no other relationships from the Tripartite Influence model were investigated.

Overall research indicates that there is strong support for the Tripartite Influence Model with adult women. However the findings indicate that the relationships between the different sociocultural pressures to be thin, internalisation of the thin ideal, upward appearance comparison and body image have been found to vary between studies. All of the theoretical models previously discussed were considered for use in the current study. The Tripartite Influence Model included a variety of different sources of sociocultural pressure to be thin (i.e. media pressure, partner pressure, friend pressure and family/parent pressure), which the other theoretical models did not. Therefore the Tripartite Influence Model was identified as the most appropriate for use in the current study.

One of the advantages of the Tripartite Influence model is that it includes some of the most robust risk factors known to influence disordered eating (Stice, 2002). The model includes both social (i.e. sociocultural pressures to be thin) and psychological factors (i.e. internalisation of the thin ideal and upward social comparisons) and provides a possible explanation of how these factors interact to influence disordered eating. However the model only focuses on variables that relate to the *content* of body image and disordered eating cognitions. Emotion/behaviour regulation tendencies (i.e. how an individual processes or responds to these private events) have also been found to play an important role in the development and maintenance of disordered eating (Callaghan, et al, 2015; Sandoz, et al, 2013; Ferreria et al, 2014). However these are not accounted for in the Tripartite Influence Model.

### **1.5. Body Image Inflexibility**

Emotion/behaviour regulation abilities are the processes by which individuals influence their own psychological experiences and how they experience and express



emotions and behaviors accordingly (Gross 2002; Hayes et al. 2006; Masuda, Hill & Tone, 2012). An emotion/behaviour regulation process particularly relevant to disordered eating is the concept of psychological inflexibility. Psychological inflexibility (also known as experiential avoidance) is a general regulation tendency to rigidly attempt to control or avoid unpleasant internal experiences and having a disposition to place extreme focus and importance on the literal content of thoughts and feelings (Hayes et al, 2006; Moore, Masuda, Hill & Goodnight, 2014). People who have high levels of psychological inflexibility find it difficult to experience negative thoughts and feelings. They react to this discomfort by trying to avoid, escape or change these negative inner experiences, in an attempt to relieve the distress. However paradoxically this increased attention given to these inner experiences, can further reinforce them and the associated distress. When a person is preoccupied with difficult inner experiences, it can make it harder for them to engage in meaningful activities which can be detrimental to their well-being in the long term (Hayes, Barnes-Holmes, 2001). Conversely, individuals who are psychologically flexible can openly allow and accept inner experiences in the present moment. This allows the engagement of behaviours which are consistent with one's personal values, even when the present moment includes unpleasant inner experiences (Hayes, et al, 2006). Consequently research has focused on both ends of the spectrum and suggests that psychological inflexibility is a central mechanism to a range of different mental health conditions and psychological flexibility is associated with positive mental health and well-being (Hayes, et al, 2006; Juarascio et al, 2013; Kashdan & Rottenberg, 2010). Measures of general psychological inflexibility have been found too general to fully capture the emotion and behaviour patterns associated with disordered eating (Sandoz et al, 2013). Whereas measures of psychological inflexibility that are specific to body image (i.e. body image inflexibility) have been found to have stronger

associations with disordered eating and negative body image compared to general measures (Sandoz et al, 2013).

Body image inflexibility is defined as a regulation tendency to rigidly attempt to control or avoid unwanted body image-related psychological experiences (Sandoz et al, 2013). Research indicates that women report significantly higher levels of body image inflexibility compared to men (Sandoz et al, 2013). There is also a growing body of research that has identified a strong positive relationship between body image inflexibility and disordered eating (e.g. anorexic, bulimic and binge eating behaviours) (Callaghan, Sandoz, Darrow & Feeney, 2015; Sandoz, Wilson, Merwin, & Kellum, 2013; Ferreria et al, 2014). Body image inflexibility is also significantly associated with many of the disordered eating risk factors outlined in the Tripartite Influence Model such as body dissatisfaction, upward appearance comparisons and internalisation of the thin ideal (Barnes & Tantleff- Dunn, 2010; Callaghan et al, 2012; Cowdrey & Park, 2012; Ferreria, et al, 2014; Hill, Masuda & Latzman, 2013; Lavender, Jardin & Anderson, 2009; Manlick, Cochran & Koon, 2013; Masuda, Boone & Timko, 2011; Merwin, Zucker, Lacy, & Elliott, 2010; Sandoz et al, 2013; Timko et al, 2014; Webb, Bulter-Ajibade & Robinson, 2014; Wendell, Masuda & Le, 2012).

Body image inflexibility has also been found to act as a moderator and mediator in the relationship between disordered eating and some of the key risk factors of disordered eating outlined in the Tripartite Influence Model (Ferreria, et al, 2014; Masuda, et al, 2011; Timko, 2014; Sandoz et al, 2013; Wendell et al, 2012). Body image inflexibility has been found to moderate (i.e. change the strength of..) the relationship between body image dissatisfaction and disordered eating (Sandoz et al, 2013). For example, Sandoz et al (2013) found that in a sample of 182 undergraduate students (70% female) (mean age=19.5), body image inflexibility moderated the relationship between body image dissatisfaction and disordered eating. Body image dissatisfaction had less of an impact on disordered eating

when body image flexibility was high. These findings were identified in both women and men separately. A limitation of this study is the relatively young age of participants (mean age=19.5, age range= 18 - 22). Therefore it is not possible to generalise these findings to older women.

Body image inflexibility has also been found to act as a mediator variable in the relationship between a number of disordered eating risk factors (e.g. body image dissatisfaction, disordered eating cognitions, self-concealment and upward appearance comparisons) and disordered eating (Timko, 2014; Masuda, et al, 2011; Wendell et al, 2012). A mediator variable is one that accounts for the relationship between the predictor and the outcome variable (Baron & Kenny, 1986). A study by Timko (2014) involved 109 female undergraduate students (mean age= 18.18) and found that body image inflexibility partially mediated the relationship between body image dissatisfaction and disordered eating (Timko, 2014). In these findings, body image dissatisfaction leads to disordered eating because body image dissatisfaction increases levels of body image inflexibility which then increases levels of disordered eating. However a limitation of this study is women were relatively young and the majority were of white ethnicity (76.15%). Therefore the findings cannot be generalised to older women from other ethnic groups.

Body image inflexibility has also been found to partially mediate the relationship between disordered eating cognitions and overall disordered eating pathology in 178 undergraduate students (62.9% female) (Wendell et al, 2012). After controlling for gender, the results indicated that disordered eating cognitions increased levels of body inflexibility which then increased disordered eating. However a limitation of this study was that the sample was undergraduate students; therefore the findings cannot be generalised to other populations.

Body image inflexibility has also been found to partially mediate the relationship between self-concealment and disordered eating symptoms in a study which involved 209 undergraduate psychology participants (79% female) aged 18 to 22 (mean age=20.35) (Masuda, et al, 2011). After controlling for gender the results suggested that engagement in self-concealment behaviours increase levels of body inflexibility which then increases levels of disordered eating. A limitation of this study is that men were also including in the analysis. The results were applicable to women since gender was controlled for. However the findings are not reflective of women specifically. It is likely that a woman's gender may also add further variance to the findings. Future studies of a similar nature could consider focusing on women only, in order to identify the relationships between variables that are specific to women.

Body image inflexibility has also been found to fully mediate the relationship between upward appearance comparisons (a risk factor for disordered eating) and disordered eating in a sample of 345 women aged 13- 36 (mean age=17.8) (Ferreria, et al, 2014). Based on these findings, it appears that engaging in upward appearance comparisons can increase levels of body image inflexibility which then leads to increased levels of disordered eating. However this study was conducted with a Portuguese sample of women. There might be cultural differences between women in Portugal compared to those in other countries such as the UK. Therefore the results cannot be generalised to participants from other countries. Body image inflexibility has also been found to partially mediate the relationship between body dissatisfaction and body appreciation (a protective factor for disordered eating) (Webb, 2015). Thus body image dissatisfaction leads to body inflexibility which then leads to a reduction in body appreciation.

Body mass index (BMI) is an important risk factor that should be considered when investigating body image inflexibility. Negative correlations have been identified between

body image inflexibility and BMI in non-clinical samples, with individuals who have high levels of body image inflexibility reporting higher BMIs (Kelly, Vimalakanthan & Miller, 2014; Masuda, Hill, Tully & Garcia, 2015; Wendell et al, 2012). Greater body image flexibility has also been found to be a protective factor against disordered eating behaviours amongst women with a lower BMI (Hill et al., 2013). However this relationship was not found for those with a BMI in the normal range (Hill et al, 2013) and other studies have failed to find this relationship at all with a female sample (Sandoz et al, 2013). Clearly the relationship between BMI and body image inflexibility is complex. However the current research suggests that body image *inflexibility* is a risk factor for being both underweight, as well as being overweight. Therefore this suggests that the relationship between BMI and body image inflexibility might not be linear. These findings indicate that BMI is a factor that researchers should consider controlling for when investigating the relationship between body inflexibility and disordered eating.

In summary, body image inflexibility has been found to have strong positive associations with disordered eating and some of the risk factors outlined in the Tripartite Influence Model. Body image inflexibility has also been found to mediate and moderate the relationship between some of these risk factors and disordered eating. This suggests that disordered eating may occur partly through avoidant and inflexible cognitions and behaviours specific to perceived body image (i.e. body image inflexibility) (Mancuso, 2016).

The next step for research investigating body image inflexibility and disordered eating is to include body image inflexibility within theoretical models of disordered eating such as the Tripartite Influence Model. This would allow the investigation of interactions between body image inflexibility and the other variables and pathways outlined in the Tripartite Influence Model. This type of study would be responding to calls from previous

research which has highlighted the need for research to investigate the relationships between body image inflexibility and other disordered eating risk factors (Timko, 2014).

A variable cannot be both a moderator and mediator in the relationship between two variables in a theoretical model (Jacoby & Sassonberg, 2010). Therefore in the current study, body image inflexibility needed to be positioned in the model either as a mediator or moderator. Previous research has suggested that body image inflexibility has been found to have a central mediating role in the relationship between two of the key variables in the Tripartite Influence Model (i.e. body image dissatisfaction and upward appearance comparisons) and disordered eating (Ferreria, et al, 2014; Timko, 2014). These findings indicate that both body image dissatisfaction and upward appearance comparisons can lead to higher levels of body image inflexibility, which can then lead to increased levels of disordered eating.

Given its central mediating role identified in previous research, in the current study body image inflexibility was placed in a similar position within the Tripartite Influence Model. Body image inflexibility was therefore investigated as a mediator within the Tripartite Influence Model to determine whether body image inflexibility could explain the influences from internalisation of the thin ideal and body image to disordered eating. Upward appearance comparison was not included in the model; instead the sociocultural pressures influenced body image through internalisation of the thin ideal alone. It therefore might be the case that the sources of pressure to be thin increase internalisation of the thin ideal, which then increases negative body image, which leads to higher body image inflexibility and then increased disordered eating. Engagement in disordered eating might therefore not just be the result of negative body image. It might also be explained in terms of getting preoccupied with negative body image related cognitions.

## 1.6. Relational Frame Theory (RFT)

In order to fully understand the concept of body image inflexibility, it is important to outline the theory which the concept is based on: relational frame theory. Relational Frame Theory argues that psychological inflexibility is developed through an interplay between language and operant conditioning (Hayes et al, 2001). In operant conditioning behaviours are learnt as a result of the consequences that occur after a response which can either reinforce or punish the behaviour (Bach & Moran, 2008). For example, in operant conditioning, a stimulus can elicit a specific behaviour due to previous experience when the stimulus was present and a specific response occurred and the response was reinforced. After regular pairings, the stimulus develops stimulus control over the behaviour, in which a person behaves in a certain way in the presence of the stimulus and a different way in its absence (Cooper, Heron, & Heward, 2007; Florentino, 2012).

Operant conditioning can explain behaviours resulting from previous stimulus-response pairings. However many behaviours are elicited through stimulus response when no previous pairing has taken place, which operant conditioning cannot explain. For example, most humans are capable of making inferences about certain types of stimuli even without direct experience of them (Hayes et al, 2001). Relational Frame Theory expands on models of operant conditioning by highlighting the important role that language has in the development of stimulus responses (Hayes et al, 2001). It explains how language enables the behaviour of a person to be influenced by stimuli even when no explicit stimulus-behaviour training has taken place through *derived relational responding*.

According to RFT, through human language and cognition, all stimuli exposed to an individual contribute to the development of a complex relational network which allows

humans to relate stimuli to each another (Bach & Moran, 2008). Words and stimuli form relational frames, which provide words with their meaning, function and relationship with other words or stimuli (Florentino, 2012). Relational frames are taught during language training and involve the comparison of stimuli (e.g. objects or events), based on non-arbitrary information (e.g. based on the physical properties of a stimulus, such size, shape or colour, or how a stimulus sounds, smells, feels, or tastes) or arbitrary information (e.g. based social whim or convention). These relational frames can lead to the development of specific beliefs and behaviours. Relational frames can be based on both direct experience and on the experiences that have shaped how an individual derives relations. There are many different types of relational frame and these create networks between each other which link different stimuli together (Hayes, Barnes-Holmes & Roche, 2001).

Relational frames of *coordination* are the most common type of relationship frame. These are relations of “identity, similarity, or sameness: this is (or is similar to) that” (Hayes, et al, 2001, p 35). Naming is the simplest type of relational frame of coordination and it requires direct stimulus-response training. For example, when a child is shown a spoon and told ‘this is a spoon’, they learn the relationship between the appearance of a spoon and the verbal word for spoon. This is an example of a relationship of *equivalence* i.e. A is the same B, the word spoon is the same as the physical object of the spoon. However there are many other types of more complex relational frames which do not need explicit training for the relationship to occur. These types of relational frames are described as *derived stimulus relations* and they have three defining features: *mutual entailment*, *combinatorial entailment*, and *transformation of stimulus function*.

**Mutual entailment.** Derived stimulus relations need to have mutual entailment. Mutual entailment is when “a relation between two events involves responding to one event in terms of the other and vice versa” (Hayes, et al, 2001, p 29). For example, if A is related



to B, then it is derived that B is also related to A. When a spoon is directly trained to the written word SPOON; a person learns that the relationship of the physical appearance of the spoon is the same as the written word SPOON. The spoon is also directly trained to the verbal word 'spoon'; a person therefore also learns the relationship of the spoon being the same as the verbal word for 'spoon'. The derived relation in mutual entailment depends on the relationship which is originally taught between the stimuli to begin with (Florentino, 2012). An example of a derived relation that has mutual entailment is: if one is taught that Jenny is bigger than Annie, then it will be derived that Annie is smaller than Jenny.

**Combinatorial entailment.** Derived stimulus relations also need to have combinatorial entailment. Combinatorial entailment is described as a “derived stimulus relation in which two or more stimulus relations (trained or derived) mutually combine” (Hayes, et al, 2001, p 30). For example, in a specific context, if A is related to B, and B is related to C, then as a result A and C are related in that context. Combinatorial entailment refers to the derived relationship between A and C. The relationship between A and C has not been directly trained, however based on the direct training of A being the same as B and B being the same as C, through relational networks a relationship between the A and C develops. For example, if one learns that Jenny is thinner than Jo, and Jo is thinner than Sami, then a derived mutual relation between Jenny and Sami is entailed (in this case, that Jenny is thinner than Sami and Sami is larger than Jenny). Similar to mutual entailment, the combinatorially entailed relations depend on the relationships between the stimuli that were originally trained.

**Transformation of stimulus function.** Derived stimulus relations also need transformation of stimulus function. Transformation of stimulus function is when a specific stimulus in a relational network which has certain psychological functions transfers some of its function/s to other stimuli in that network via the underlying derived relation. For example

if stimulus A has a particular function in contexts where stimulus A is equivalent to stimulus B, then B will acquire a similar function. For example, if Annie was taught by her family that ‘fat’ means ‘unattractive’, and that ‘fat’ and ‘big boned’ have a similar meaning, then if a family member calls someone ‘big boned’ she might derive that they are calling them unattractive. However if she was in a different context and heard a PE teacher calling a tennis player big boned, she may not interpret these words to mean unattractive. Contextual cues therefore create and specify the particular conditions under which the relational activity occurs and they also stipulate which functions will be transformed (Hayes, et al, 2001). The term ‘transformation’, is important because it recognises that stimulus B may not be a neutral stimulus and may already possess functions learnt previously. Therefore stimulus B (i.e. the receiving stimulus) may retain its initial function in some contexts. However, in the training context, the function of the receiving stimulus is combined with any other previously learnt functions that may also be activated in the current context. Therefore the stimulus will function as a result of the combination of functions rather than replacing the previously learnt function/s (Hayes, et al, 2001).

There are many different types of derived stimulus relational frames. Comparative, hierarchical and deictic relational frames are particularly relevant to body image and disordered eating (Pearson, Heffner & Follette, 2010). A comparative relational is when a stimulus is responded to in terms of a quantitative or qualitative relation along a specified dimension with another stimulus (Hayes, et al, 2001). There are many different subtypes of comparison (e.g. bigger-smaller, better-worse, attractive-unattractive). For example: ‘Jo is thinner than Jenny’ or ‘Jo is prettier than Jenny’. A hierarchical frame involves comparing aspects of stimuli along the dimension of hierarchical class membership (e.g. ‘types of’, ‘includes’, ‘*A is an attribute or member of B*’). For example, ‘the thinner a woman is the more beautiful she is’ (Pearson et al, 2010).

A deictic frame is a relation that is based on the perspective of the speaker e.g. I-you (and all of its related correlates, such as “mine”), here-there, now-then (Hayes, et al, 2001). For example, ‘*I* am fat and you are thin’. A deictic frame may also include a mixture of frames. For example ‘I am fatter than Jenny’, contains both the perspective of the listener ‘I’ and a comparative element ‘fatter’. In these relational frames, relations with words become a function of meaning, rather than just a relation with the form of an object. The ability to think relationally, therefore allows humans to not only make predictions within the world but also allows the generation of various other relations (Bach & Moran, 2008).

Derived stimulus relations can aid human learning, allowing people to evaluate outcomes, make future plans and can protect people from harm. However the connections that language allows humans to make are not necessarily always correct, since they are often based on arbitrary information. Also these relations have been more likely to have been communicated, as opposed to being experienced directly, making the testing and elimination/correction of these incorrect relations much less likely/difficult (Bach & Moran, 2008). Individuals with body dissatisfaction who are engaging in disordered eating may make such arbitrary and incorrect relations between thinness, physical attractiveness, dieting and life success (Neziroglu et al, 2008). Through the use of language and the meaning that language gives to cognitions, these arbitrary relations evoke specific emotional responses (e.g. shame, anxiety) and behaviours (e.g. disordered eating) because of verbally imposed reinforcement.

Body dissatisfaction and disordered eating can therefore be the result of direct conditioning or through derived stimulus responses (Bach & Moran, 2008). For example, if a woman is teased by their partner for having a ‘big’ bottom when she is wearing a bikini, she may feel ashamed of her body and in future situations (e.g. wearing a bikini or similar) feelings of shame might be instigated. Through derived relational framing, the woman may

also relate the word 'big' to other similar words as large, fat or heavy. Then in future situations these similar words alone (e.g. when other people are not actually making negative comments about her appearance) can elicit the same aversive affect (i.e., conditioning via a relational frame). Similarly words that relate to body parts that she associates with her bottom such as her thighs may also provoke the same responses. Words that are related to similar concepts can provoke similar thoughts. This is why a person with negative body image may respond with aversive affect or behaviours to any word or experience that reminds them of an unpleasant situation that they have previously experienced. Even if in future instances people are not actually making negative comments about her appearance (Neziroglu et al, 2008).

RFT also highlights that *context* also influences relation responding. This includes the contextual factors of a person's history, previous learned relations of the words and the contextual factors of the situation (e.g. the different types of relational frames connected with the words, who the person is that said the words and the tone of their voice) (Pearson et al, 2010). For example, the statement 'you're a big girl now', when said to a 2 year old who has just learnt to walk can be a statement of commendation associated with being more mature, or skilled. However the same statement can be used by parents to stop challenging behaviours, for example, 'stop that, you're a big girl now'. Conversely this phrase might instigate feelings of embarrassment for the child. The child learns these different arbitrary relations based on the same words. In a different context, if the same words 'you're a big girl now', are said by an eighteen year old boy to a seventeen year old girl at the beach, it is less likely that the words 'big' and 'girl' will have positive relations. A seventeen year old would have developed many different relations with these words which are context dependent, including the relations between the words and previous experiences and between the words and the person that is saying them and she is likely to feel upset (Pearson et al,

2010). Based on contextual factors such as the current situation (e.g. location of experience, the type of person involved in the communication and the tone of their voice), previous experiences and learned relations of the words “big” and “girl”, the function of these words has changed, but the actual words in these different examples has not (Pearson et al, 2010).

Women with high levels of body image inflexibility have a tendency to rigidly respond to experiences based on their relational frames and conditioning which can increase levels of body dissatisfaction and distress. These negative experiences can lead them to engage in avoidance behaviours in an attempt to relieve themselves of the difficult feelings (i.e. negative reinforcement). For example a woman might engage in disordered eating behaviours in an attempt to lose weight, so that she can escape the distressing emotions that she is experiencing in relation to her body image dissatisfaction.

However from an RFT perspective, attempting to avoid distressing cognitions and feelings is likely to provide further reinforcement. For example, if one tries to avoid thinking about negative body image thoughts by thinking about disordered eating, a relational connection can be established between the two. Therefore thinking about disordered eating then instigates the same aversive reaction as negative body image thoughts. This effect can become even stronger through the processes of combinational entailment and transfer of stimulus response (Hooper, Saunders & McHugh, 2010).

In summary, RFT postulates that people will experience words differently based on the context and their relational frames. Individuals with high levels of body image inflexibility have a tendency to respond more rigidly to conditioning, contextual relations and relational frames which makes them more susceptible to disordered eating. Previous research has identified that body image inflexibility has a mediation role in the relationship between a range of disordered eating risk factors and disordered eating (Ferreria, et al, 2014;

Masuda, et al, 2011; Timko, 2014; Wendell et al, 2012). However, previous studies have tended to investigate these relationships with only one or two risk factors at a time. Yet theoretical models of disordered eating argue that disordered eating is influenced by a range of risk factors simultaneously (Thompson et al, 1999). No research to date has investigated the mediation role of body image inflexibility within an established theoretical model of disordered eating such as the Tripartite Influence Model. This study will allow the investigation of the potential mediating effects of body image inflexibility on the established relationships between risk factor variables (i.e. the difference sources of pressures to be thin, internalisation of the thin ideal, body image) and disordered eating simultaneously.

*This literature review has demonstrated a critical understanding of the current state of knowledge in that field of body image inflexibility and disordered eating.* In light of these findings, it is important to investigate whether body image inflexibility mediates any of the key risk factor relationships described in the Tripartite Influence Model between the sociocultural sources of pressure, internalisation of the thin ideal, body image and disordered eating. By identifying the contributing role that body image inflexibility might play in the Tripartite Influence Model, it is hoped to gain a greater understanding of how this construct influences disordered eating behaviours and of the potential mechanisms involved in the key Tripartite Influence Model relationships. These findings have the potential to inform clinicians and researchers who are involved in the development of interventions that aim to help women who are struggling with disordered eating.

## **1.7. Study Hypotheses**

The hypotheses for the current study are:

**Hypothesis 1:** When body image inflexibility is added to the Tripartite Influence Model, body image inflexibility will mediate the relationship between body image and disordered eating.

**Hypothesis 2:** When body image inflexibility is added to the Tripartite Influence Model, body image inflexibility will mediate the relationship between internalisation of the thin ideal and disordered eating.

## **2. Method**

### **2.1. Design**

*The range of study design methods that were considered for this study and the rationale for the chosen method will now be outlined in order to demonstrate a critical understanding of the methodology of the enquiry.* Both quantitative and qualitative approaches were considered when designing the current study. However qualitative methods are not appropriate for testing theoretical models or hypotheses or to identify factors that predict or mediate specific outcomes such as disordered eating behaviours. Therefore qualitative methods were identified as not appropriate for the current study

Quantitative research is based on numerical data analysed statistically. Quantitative research involves ‘explaining phenomena by collecting numerical data that are analysed using mathematically based methods (in particular statistics)’ (p 12, Aliaga & Gunderson, 2000). Quantitative data can be obtained using various methods including questionnaires/surveys, experiments (e.g. reaction times to memory tests) or observational research. One of the benefits of using quantitative methods is the ability to collect large scale quantitative data, where statistical analysis of variables can be conducted to identify causal variables or

correlational relationships (Muijs, 2010). A quantitative survey completed by a large number of participants also offers the potential to generalise the findings to wider situations. Quantitative approaches can be used to investigate the factors that predict or mediate specific predictor and outcome variables and allows the testing of established theoretical models such as the Tripartite Influence Model. Since the aims of the current study were to identify whether body image inflexibility would mediate the established relationships within the Tripartite Influence Model, a quantitative approach was identified as the most suitable and was chosen for the research design of this current study.

In quantitative research, in order to test an established psychological theoretical model, a set of questions or a questionnaire is required to measure each construct that is to be investigated. The types of questionnaire available can be divided into two types: ad-hoc questionnaires and standardised questionnaires. Ad-hoc questionnaires are questionnaires that have been created by a researcher for a particular study. Ad-hoc questionnaires can collect useful data because they ask the exact questions that the researcher wishes to answer. However these types of questionnaire have not been through formal psychometric testing, therefore their psychometric properties have not been tested nor confirmed and have not yet been proven to measure what they are intended to measure (Pusic, et al, 2007).

Alternatively standardised questionnaires have been through rigorous psychometric testing with the population that they are intended to be used with. Therefore their reliability (e.g. ability to yield consistent scores over time) and validity (e.g. ability to measure what it intends to measure) will have been tested and confirmed (Pusic, et al, 2007). This means that they are reliable and have been proven to measure what they are intended to measure. Using standardised questionnaires also allows the comparison of study results with other published findings in the field. Since the aim of this study was to investigate the established Tripartite Influence Model of disordered eating and compare the results with previous research,



standardised questionnaires were chosen that have been frequently used in appearance research to measure the study variables.

Quantitative questionnaires can come in a number of formats including face-to-face, telephone, postal/mail, or online. Face-to-face and telephone questionnaires involve a researcher giving out the questionnaire or going through the questionnaire with the participant. These surveys are clearly structured and flexible. They are based on personal interaction and can be controlled within the survey environment. Researchers can explain questions that are difficult for participants to understand and respondents can be monitored to ensure that they are completing the questionnaire correctly. However, there are also disadvantages to face-to-face and telephone questionnaires, such as interviewer bias, high cost per respondent and geographical limitations (for face-to-face questionnaires (Alreck and Settle, 2004; Holbrook et al., 2003).

Postal/mail questionnaires allow participants to complete the questionnaire in their own time and return it in the post. Postal questionnaires have the advantage of participants completing them in privacy and in their own time. However using postal questionnaires can be expensive (e.g. paper and stamps) and can create participant burden when participants have to find a post box to return the questionnaire.

Compared to paper formats, online questionnaires overcome some of the limitations associated with paper questionnaires and have a number of advantages for both researchers and participants (Weigold, Weigold & Russell, 2013). Online questionnaires offer researchers the ability to reach larger and more diverse populations, remove the need for data entry and reduce survey administration costs (Buchanan & Smith, 1999; Cantrell & Lupinacci, 2007; Gosling, Vazire, Srivastava, & John, 2004). Researchers also have greater flexibility in the way that online questionnaires are presented to participants such as the

ability to randomise the question presentation order, which can reduce the potential of order effects (Boyer, Olson, Calantone, & Jackson, 2002).

For participants, online questionnaires can be completed in privacy and in their own time and are less burdensome since participants are not required to post back the completed questionnaire, which can be particularly useful for recruiting hard to reach groups (Naus, Philipp & Samsi, 2009). Online questionnaires are also the optimal format for investigating potentially sensitive and embarrassing topics (such as disordered eating). For example research has found that participants answer more sensitive questions online compared to paper formats (Kays, Gathercoal & Buhrow, 2012; Schaefer & Dillman, 1998).

However there are some limitations to online questionnaires. For example online questionnaires require participants to have internet access; therefore this format is not appropriate for certain populations (such as the elderly) who are less likely to have the internet. Similarly, if participants were to find specific questions ambiguous, it can be difficult to gain clarification, since no interviewer is present and this may lead to less reliable data. To improve online questionnaire reliability, Dillman, Smyth and Christian (2014) therefore recommend pretesting the questionnaire with a small selection of participants who are typical of likely respondents. In the pretesting phase, participants can be asked about their understanding of the questions, questionnaire instructions and about the relevance of the questions. The questionnaire can then be amended based on the participant feedback, which can increase the readability and reliability of the questionnaire.

Non-response rates are another limitation of online questionnaires. Although research suggests that online questionnaires yield similar response rates to paper formats, several types of non-response can still occur in online formats (Weigold, Weigold & Russell, 2013; Vehovar, Lozar Manfreda & Zaletel, 2002). Participants may answer questions selectively, stop responding during the process or respond to certain questions and not others.

To reduce the likelihood of missing data, Dillman, Smyth and Christian (2014) recommend a number of features that can be included in the design of online surveys to improve response rates. For example researchers should ensure that the importance of the results of the study is included in the information sheet in order to increase participants' motivation to complete the questionnaire. Also progress bars can be included in the questionnaire to show participants how far they have progressed and motivational information (e.g. reminding participants of the importance of their responses for the study) can be added to the questionnaire at different occasions to motivate participants to continue completing the questionnaire. These features have been found to reduce missing data in online questionnaires (Dillman, Smyth & Christian, 2014).

When a dataset has missing data there is at risk of a non-response error, particularly if non-respondents differ from respondents in characteristics that are important to the research study (e.g. disordered eating behaviours, body image) (Vehovar & Lozer Manfreda, 2008). One way to identify and minimise the influence of non-response rates on research outcomes is for researchers to conduct a missing data analysis on the final dataset (e.g. tests for missing data at completely random (MCAR)). These tests can identify whether or not non-response patterns have been influenced by certain participant characteristics. If missing responses are identified as not missing at random, then this can be taken into consideration when interpreting the results. However if missing responses rates are identified to be missing completely at random then it can be argued that non-response rates are unlikely to influence the research findings.

Each of the aforementioned questionnaire formats were considered for the current study. Since this research study was investigating topics that were potentially sensitive to participants and there was no research budget, an online questionnaire format was identified as the most suitable.

A quantitative online survey was used to collect the data. The online survey was designed and hosted using the online survey programme Qualtrics ([www.qualtrics.com](http://www.qualtrics.com)). The survey included a number of standardised psychometric measures chosen to reflect the study aims (i.e. to investigate the role of psychological inflexibility within the Tripartite Influence Model of disordered eating).

## **Ethical approval**

Ethical approval was granted by the Ethics committee at the University of the West of England (Appendix B).

## **2.2. Participants**

A total of 387 women, aged 18 to 65 ( $M=31.01$ ,  $SD= 11.98$ ) participated in this study. 79.3% identified as White British, followed by 8% as White Other, 2.6% as Black African, 1.6% as Asian/Asian British Indian, 1.6% as Mixed: White and Asian, 1.3% as Chinese, 1% as mixed race other, 1% identified as other, 0.8% identified as Asian or Asian British, 0.5% as Asian British Pakistani, 0.5% as Black British or Black Caribbean, 0.5% as being Mixed: White and Black Caribbean, 0.5% identified as Mixed White and Black African, 0.5% preferred not to report their race and one woman 0.3% identified as Black other.

The greatest proportion of women (38%) were single (never married), while 27% were married/in a civil partnership, 16% were cohabiting, 14% were in a relationship but not living together, and 5% were divorced/separated. 92% identified as heterosexual, 3.6% were bisexual, 3.4% did not report their sexuality and 1% were gay or lesbian. In respect to the

highest level of education achieved, most women (41.3%) had an undergraduate degree, 30% had a secondary/high school qualification or a vocational qualification, 19.1% had a Masters degree and 9.6% had a doctorate/PhD.

35.1% participants were recruited through adverts on Twitter/Facebook/word of mouth. 34.1% participants were undergraduate psychology students at the university, 27.4% were university staff and 3.4% were non-psychology university students.

The reported weights and heights of participants resulted in a range of body mass indices from 13 to 40, with a mean BMI of 24.07 (SD= 4.77), which is categorised in the 'normal' weight range (BMI = 18.5 – 24.9) (Garrow & Webster, 1985). Most women (61%) were within the normal weight range (BMI= 18.5 – 24.9), 21.7% classified as overweight (BMI= 25 – 29.9), 11% fell in the obese category (BMI $\geq$ 30) and 6.3% were in the underweight category (BMI= < 18.5) (Garrow & Webster, 1985).

### **2.3. Procedure**

The data reported in the study was collected as part of a larger dataset which included male participants. Both female and male participants were recruited at the same time. However female and male participants completed different gender-specific psychometric measures. Research has identified significant gender differences in disordered eating attitudes and behaviours (Anderson & Bulik, 2004; Gadalla, 2009; Guidi et al., 2009; Hudson, et al, 2007; Kashubeck-West, et al, 2005; Neumark-Sztainer, et al, 2011; Striegel-Moore et al., 2009; Weltzin et al, 2005). Due to the gender differences in disordered eating attitudes and behaviours, it is most appropriate to investigate women and men separately when testing theoretical models of disordered eating such as the Tripartite Influence Model. Due to the nature and word limit of this thesis, only data relating to female participants is

reported in this thesis. Data related to male participants will be reported in future publications.

Participants were recruited via advertisements on the University and Research Centre websites and their respective Facebook and Twitter pages. Participants were also recruited via the University Psychology Department Participant Pool, a scheme that allows psychology students to sign up to research studies via a website to gain course credit through participation.

The advertisements included a brief summary of the study, the survey participation incentive and a website link to the online survey. The research was described as a study exploring body thoughts, body attitudes and health behaviours. The study was advertised as recruiting both women and men (e.g. are you a woman or man aged 18 or over? Do you want to be entered into a prize draw to win one of three £20 Amazon vouchers? Please complete our body attitudes and health behaviours survey..). Participants were also encouraged to share the survey link on social media (e.g. Facebook) or via email to other friends who they thought might be interested in taking part.

Interested participants were directed via a web link directing them to the study webpage. This provided the information sheet (Appendix C) which offered further details about the study and included assurances of anonymity together with reassurance that participants could withdraw from the study at any time by closing down their web browser or by emailing the lead researcher with their participant code up to four weeks after completing the survey. If participants chose to take part, they completed the online consent form (Appendix D) and were immediately directed to the beginning of the online survey, which included the demographic questions (Appendix E) and the psychometric measures. Participants who accessed the online survey via the university psychology participant pool

received course credit for their participation. Those who accessed the survey through the other websites/social media were offered the opportunity to be entered into a prize draw to win one of three £20 Amazon vouchers.

Participants were not required to provide any identifying information. At the end of the survey, participants were provided with debriefing information that explained more fully the purpose of the study and the contact details for a number of psychological support groups in the event they might feel distressed after completing the survey (Appendix F).

A number of strategies were utilised in the survey design in order to reduce participant attrition and missing data. A validity check question was integrated within the survey. This question requested participants to select a specific answer (e.g. Please choose 'Always' for this question) in order to control for careless or random responding (Tylka, 2011b). Participants who failed the validity check were not included in the final data set. To increase the participants' motivation to complete the survey, additional motivating information was included at two occasions in the survey. On the first occasion, motivating information reminded participants of the importance of their answers for the study findings. The second occasion was halfway through the survey and informed them that they were halfway through and encouraged them to finish the survey. A progress bar was also added so participants could monitor their progress. This is consistent with the recommendations by Dillman, Smyth, & Christian (2014) for improving participants' responses in online surveys. Additionally the order in which questionnaires were presented to participants was randomised (using the randomisation feature in Qualtrics) to reduce any potential ordering effects.

### **Pre-testing survey**

The Department of Health has highlighted the importance of service user involvement in health research (Department of Health, 1999). To ensure that the survey questions were relevant and readable to participants, the survey was therefore pre-tested with four participants over the age of 18. This involved participants completing the survey and providing their feedback on the questions, survey instructions and format/presentation of the survey. Participants suggested some minor changes to the presentation format such as increasing the font size, creating smaller question blocks and including additional demographic questions. Overall, the survey was identified as acceptable to participants.

#### **2.4. Measures**

All necessary approvals were obtained from the authors of the psychometric measures used in the current study. A number of standardised questionnaires were used to measure the constructs being assessed in order to investigate the research hypotheses.

**Hypothesis 1:** When body image inflexibility is added to the Tripartite Influence Model, body image inflexibility will mediate the relationship between body image and disordered eating.

**Hypothesis 2:** When body image inflexibility is added to the Tripartite Influence Model, body image inflexibility will mediate the relationship between internalisation of the thin ideal and disordered eating.

The following standardised questionnaires were chosen because they were well validated with female participants (i.e. their validity and reliability with this population was evidenced). The measures were selected because they had been used in previous research which has investigated the Tripartite Influence Model with women or had been used in other body image, body image inflexibility or disordered eating research. This allowed the



comparison of the results of this study with previous research (Callaghan, Sandoz, Darrow & Feeney, 2015; Huxley et al, 2014, Johnson et al, 2014; Mancuso, et al, 2016; Moss & Rosser, 2012, Rodgers, et al, 2011; Slevec & Tiggemann, 2011a; Tylka & Wood-Barcalow, 2015; Van den Berg, et al, 2002).

In order for ease of readability of the pathways in the latent variable SEM, all measures were scaled in the same direction i.e. greater scores reflected more unhelpful or negative cognitions or behaviours.

The psychometric measures that tested the different components of the adapted Tripartite Influence Model will now be outlined below.

**Body image inflexibility.** The Body Image Psychological Inflexibility Scale (BIPIS) (Callaghan, et al, 2015) was used to measure this construct (Appendix G). This scale is a 16-item measure on a scale from never true (scored as 1) to always true (scored as 7). One positively worded item was reverse scored. All items were then averaged to a total score, with higher scores representing higher levels of body image-related psychological inflexibility. Previous research identified evidence of internal consistency ( $\alpha=0.93$ ), convergent validity and test-retest reliability ( $r = .90$ ) (Callaghan et al, 2015). In the current sample the Cronbach's alpha was = 0.95.

### **Measures of body image**

When investigating the construct of body image, recent research has highlighted the importance of including measures of positive body image in addition to negative body image (Tylka, 2011a). In light of this and to ensure that the latent variable for body image in this study reflected the breadth of this construct, three measures of body image (two negative body image and one positive body image) were chosen to represent the body image latent variable.

The two measures of negative body image were: the Appearance Evaluation subscale of the Multidimensional Body-Self Relations Questionnaire (MBSRQ-AE) (Brown, Cash, & Mikulka, 1990) (Appendix H) and the Centre for Appearance Research Valence scale (CARVAL) (Moss & Rosser, 2012) (Appendix I).

The MBSRQ-AQ was chosen because it measures body shape and physique evaluation and it is widely used in the body image field and would therefore allow direct comparisons with previous research (Brown et al, 1990; Cash et al, 1994; Mazzeo, 1999). The CARVAL was chosen because it focuses on broader aspects of appearance beyond body shape and physique, therefore it allowed a broader measure of body image evaluation to be collected.

The measure of positive body image was the Body Appreciation Scale 2 (BAS-2) (Tylka & Wood-Barcalow, 2015b) (Appendix J). Body appreciation is the central organising variable of positive body image. The BAS-2 was chosen because it measures other aspects of body image that are broader than body image evaluation. This includes accepting and respecting your body and focusing on how a body functions rather than how it looks. The BAS-2 was also chosen because it is the most recent version of the most commonly used measure of body appreciation (i.e. the Body Appreciation Scale (BAS), Avalos, Tylka & Wood-Barcalow, 2005). BAS-2 was adapted using the original Body Appreciation Scale which according to the authors was limited by a number of body dissatisfaction questions. The BAS-2 was therefore chosen as it was identified to have superior question content that was more specific to body appreciation than the original BAS (Tylka & Wood-Barcalow, 2015b). Structural equation modelling requires the indicators of a latent variable to correlate with each other to at least .7 (Kline, 2005). The correlations of the body image measures used in this study ranged from .79 to .83. It was therefore deemed appropriate to include the three body image measures within the same latent variable.

**1. Negative Body image.** The Appearance Evaluation subscale of the Multidimensional Body-Self Relations Questionnaire (MBSRQ-AE) (Brown, Cash, & Mikulka, 1990) was used (Appendix H). This 7-item scale measured participants' self-perceived attractiveness on a 5-point Likert scale with responses ranging from definitely disagree (scored as 1) to definitely agree (scored as 5). Items were reverse scored and then averaged with higher scores indicating body image dissatisfaction and lower scores reflecting body image satisfaction. Previous research provides evidence that the MBSRQ-AE has evidence of construct validity (Brown et al, 1990), internal consistency (Cronbach's alphas ranging from between 0.72 and 0.84) (Cash et al, 2004) and test-retest reliability ( $r = 0.85$ ) (Mazzeo, 1999). In the current sample the Cronbach's alpha was 0.90.

**2. Negative Body image.** Centre for Appearance Research Valence Scale (CARVAL) (Moss & Rosser, 2012) was used (Appendix I). This measures the extent to which an individual evaluates their appearance in a positive/ negative way. It has 8 items with Likert scale response categories ranging from 1 (strongly disagree) to 6 (strongly agree). Responses are summed and averaged to create a total score. Higher item scores indicate a more negative evaluation of appearance. CARVAL has evidence of internal consistency ( $\alpha=0.93$ ), convergent and divergent validity and test-retest reliability ( $r = 0.89$ ) (Moss & Rosser, 2012). In the current sample, Cronbach's alpha was 0.82.

**3. Positive body image.** Body Appreciation Scale 2 (BAS-2) (Tylka & Wood-Barcalow, 2015b) was used (Appendix J). This 10-item scale measures positive body image. Participants answered on a 5-point Likert scale from never (scored as 1) to always (scored as 5). Responses were reverse scored and then averaged to produce a total score. Higher scores reflect lower levels of positive body image. The BAS-2 has evidence of internal consistency ( $\alpha= 0.94$ ), test-retest reliability ( $r = 0.94$ ), and construct (convergent,

incremental, and discriminant) validity (Tykla et al, 2015b). In the current sample the alpha was 0.95.

**Internalisation of the thin ideal.** The 9-item female version of the Internalisation general subscale of the Sociocultural Attitudes Toward Appearance Questionnaire Revised (SATAQ-3) was used (Thompson, van den Berg, Roehrig, Guarda & Heinberg, 2004) (Appendix K). This measures the extent to which women internalise the thin media ideal as their personal standard. Items are rated on a five-point response scale ranging from definitely disagree (scored as 1) to definitely agree (scored as 5), with higher scores indicating greater internalisation of the thin ideal. Items are averaged to produce a total score. Previous research indicates that the SATAQ-3 has high levels of internal consistency ( $\alpha = 0.96$ ) and convergent validity (Thompson et al, 2004). In the current sample the Cronbach's alpha was 0.93.

**Perceived pressure to be thin.** The 8-item Perceived Sociocultural Pressures Scale (PSPS; (Stice, Nemeroff & Shaw, 1996) was used to measure the extent to which women reported feeling pressure to be thin from four different sources: friends, family, dating partners, and the media (Appendix L). Items are rated on a five-point response scale ranging from 1 (never) to 5 (always) and were averaged to produce a total score. Higher scores reflected greater perceived pressure to be thin. The PSPS has evidence of internal consistency ( $\alpha = .87$ ), test-retest reliability ( $r = .93$ ) and convergent validity with retrospective reports of pressure to lose weight in childhood ( $r = .51$ ) (Stice et al, 1996). The Cronbach's alpha in this sample was .72.

**Disordered eating behaviours.** The Eating Attitudes Test (EAT-26) (Garner, Olmsted, Bohr & Garfinkel, 1982) was used to measure eating disorder symptomatology (Appendix M). The scale has 26 items that are rated on a scale ranging from never (scored as 6) to always (scored as 1). There are three subscales: Dieting, Food Preoccupation, and

Oral Control. The Dieting subscale reflects the extent to which individuals restrict intake, obsess about thinness, and experience eating related discomfort. The Food Preoccupation subscale measures the extent to which people feel controlled by food and food-related thoughts and engage in bulimic behaviour. The Oral Control subscale assesses highly-controlled eating behaviours and the extent to which respondents feel pressure to gain weight or eat more. Garner, et al (1982) recommend that the responses never, rarely, and sometimes receive a score of 0, while the responses often, very often, and always receive scores of 1, 2, and 3, respectively. However, in the current study, the EAT-26 scores were treated as continuous variables and the items were reverse scored and averaged to calculate total scores. This resulted in higher scores reflecting greater disordered eating behaviour for all subscales. The rationale for using continuous scoring was due to the current sample being non-clinical and therefore having a low rate of eating disorders. It was expected that few participants would score above the cut-off point, and therefore, the distribution of EAT-26 scores would be skewed, violating the assumptions of structural equation modelling. Research has previously used this continuous scoring method with nonclinical samples of women (e.g., Mazzeo, 1999; Tylka & Subich, 2004). Among college women, the EAT-26 scores have evidence of internal consistency ( $\alpha = 0.91$ ), test-retest reliability ( $r = .86$ ), and concurrent validity (Mazzeo, 1999; Tylka & Subich, 2004). In the current sample the subscale alphas were 0.88 for Dieting, 0.80 for Food Preoccupation and 0.69 for Oral Control. The parcel loadings for the Oral Control scale were  $< .4$  which is below the cut off (Little, Rhemtulla, Gibson & Schoemann, 2013). Therefore only the dieting and food preoccupation subscales were used in this current study.

**Body Mass Index (BMI).** Participants reported their height in feet and inches or meters and centimeters and their weight in stones and pounds or in kilos. This information was converted to metric units and BMI was calculated: (weight (kg)/height (m)<sup>2</sup>).

**Upward appearance comparisons.** A measure of upward appearance comparison was also collected (Upward Physical Appearance Comparison Scale; O'Brien et al, 2009). However the items on this scale overlapped with items in the measure for Internalisation of the thin ideal and this caused problems (i.e. suppression effects) in the preliminary statistical analysis. Therefore the upward appearance comparison measure was not included in the analysis. This decision is consistent with previous research which has tested the Tripartite Influence Model with adults (Huxley et al, 2014; Tylka, et al, 2011b). These studies only included a measure of internalisation of the thin ideal and not a measure of upward appearance comparison for similar reasons (e.g. to avoid causing problems in the analysis caused by overlap between the constructs) (Huxley et al, 2014; Tylka, et al, 2011b).

## **2.5. Data analysis**

*In order to demonstrate a critical understanding of the methodology of enquiry, the range of statistical analyses that were considered to analyse the data and the rationale for the chosen statistical analysis will now be outlined.* Multiple regression was the first statistical analysis considered. Multiple regression allows the evaluation of constructs and relationships between constructs (Musil, Jones & Warner, 1998). It predicts the variance of an independent variable, based on linear combinations of independent variables. However variables can only be independent or dependent and cannot be both and only one dependent variable can be investigated at a time. The model constructs also have to be performed in

sequential steps, therefore simultaneous evaluation of model construct relationships is not possible. The difficulty with these assumptions is that many psychological research studies are interested in measuring more than one dependent variable at the same time and many outcome variables can also be independent/predictor variables and vice versa. Additionally, all variables in multiple regression are assumed to be observable and to have no measurement error (i.e. perfect measurement of variables). However the majority of variables that were measured in the current study (such as body image or body image inflexibility) are *latent variables* which are constructs which cannot be *directly observed* (Byrne, 2013). The existence of latent variables must be inferred from measured variables. Since latent variables are not directly observed, some degree of random measurement error may exist (e.g. from participants misunderstanding the question). Therefore measurement error needs to be accounted for in the statistical model. Multiple regression is not capable of assessing or correcting for measurement error, which can lead to the underestimation or overestimation of biases in the relationships between the investigated constructs (Williams, Grajales & Kurkiewicz, 2013). The aim of the current study was to look at the relationships between a group of latent variables simultaneously (in the adapted Tripartite Influence Model), when some variables were both independent/predictor and dependent/outcome variables. It was therefore determined that multiple regression was an inappropriate statistical analysis to analyse the data in the current study.

Path analysis was the next statistical analysis considered. Path analysis is an extension of multiple regression and a form of structural equation modelling (Musil, Jones & Warner, 1998). It specifies relationships between observed variables simultaneously, allows the investigation of more than one dependent variable at a time and allows variables to be both independent and dependent. However path analysis encounters the same limitation as multiple regression in that it only uses observed variables. Therefore it assumes that the

variables are measured without measurement error, which can lead to biases in the analysis. Since the current study involves the investigation of latent variables, path analysis was determined as not appropriate to analysis the data.

Latent variable structural equation modelling (SEM) (a form of structural equation modelling) was the final statistical analysis considered for use in the current study. Latent variable SEM is a technique used for representing, estimating and testing a theoretical model of linear relationships among variables (MacCallum & Austin, 2000). This analysis is similar to path analysis, in that it allows the relationships between a group of variables to be investigated simultaneously, there can be more than one dependent variable investigated at a time and variables can be both independent and dependent. However latent variable SEM has one advantage over path analysis in that it can also incorporate both latent (unobserved) and measured (observed) variables (Byrne, 2013). The benefit of using latent variable SEM, is that the error can be been estimated and removed, resulting in latent variables that are free of random error (Kelloway, 1998).

In latent variable SEM, latent variables are required to be represented by the covariances of two or more measured indicators. There are a number of different aggregation levels of latent variable indicators (i.e. *total aggregation*, *total disaggregation* and *partial disaggregation* (Coffman & MacCallum, 2010). *Total aggregation* means that all items in a scale are summed or averaged to produce one indicator. However a latent variable needs at least *two* indicators. Therefore if total aggregation used, this results in only one indicator and this variable then becomes an observed variable. If total aggregation is chosen for a latent variable, at least two psychometric measures will therefore be needed to represent that latent variable. In research such as the current study, which involves the investigation of a number of latent variables, it is not realistic to ask participants to complete two psychometric measures for each latent variable being studied. Since this would significantly increase the



survey length and the completion time for participants and is likely to overburden participants making them more likely drop out or provide high levels of missing data (Cunningham, Ansara, Wild, Toneatto, & Koski-Jännes, 1999; Iglesias & Torgerson, 2000).

*Total disaggregation* means that each item in a psychometric measure serves as an indicator for the latent variable. However if the psychometric measure used to represent the latent variable has a large number of items, this increases the number of measured variables and parameters in the model. This then increases the order of the correlation or covariance matrix and the larger the correlation matrix, the less likely the model will fit the data. Also the more parameters in the model, the larger the sample size that is required to achieve an acceptable model fit (Byrne, 2013).

An alternative level of aggregation for latent variable indicators that overcomes some of the limitations of *total aggregation* or *total disaggregation* is called *partial disaggregation*. This method involves summing or averaging groups of items within a psychometric measure which results in parcels which are then used as multiple indicators. Since this method creates parcels of items, the technique is often referred to as *parcelling* (Little, Rhemtulla, Gibson & Schoemann, 2013). This method overcomes the limitation of the total disaggregation method, since using parcels rather than items for indicators reduces the number of parameters in the model which increases the likelihood of model fit and reduces the sample size required for an adequate model fit (Coffman & MacCallum, 2010). Also since only one psychometric measure is required to represent each latent variable in the parcelling method, parcelling helps overcome the potential participant burden often associated with the *total aggregation method* (which requires at least two psychometric measures for each latent variable).

After considering the different statistical analysis methods available to analysis the data for this study, latent variable SEM using the parcelling method to create latent variables was identified as the most appropriate analysis for the aims of the study.

### **Latent variable structural equation modelling**

Latent variable SEM was used to evaluate the potential role of body image inflexibility within the Tripartite Influence Model and its pathways for predicting disordered eating. AMOS version 22 (Arbuckle, 2013) with ML estimation was used to test the model. The process of latent variable SEM is a two stage process. The first stage involved testing the measurement model fit using a confirmatory factor analysis, with parcels used as indicators for their respective latent variable. This process examined the relationships between latent variables and measured variables (e.g. indicators) by allowing all the latent variables to correlate. The measurement model is required to fit the data before the structural model (i.e. the theoretical model to be investigated) is tested. The second stage consisted of testing the fit of the structural model; this involved specifying the theoretical relationships between variables and determining whether the specified theoretical model fits the data. If the structural model does not initially fit the data, model modification (based on theory) can be conducted where pathways can be added or removed in order to improve the fit of the model (Byrne, 2013).

Before testing the measurement model, indicators were created for each of the latent variables. A latent variable was constructed for body image by allowing each total score of the three body image measures (CARVAL, MBSRQ-AE and BAS-2) to estimate it. For each latent variable representing body image inflexibility and internalisation of the thin ideal, three parcels (i.e. measured indicators) were constructed following the specifications by Russell, Kahn, Spoth and Altmaier (1998). This is a four stage process. In the first stage,

exploratory factor analysis was conducted for each measure using the maximum likelihood (ML) method of extraction specifying a single factor extraction. In the second stage, items were rank ordered by the magnitude of the factor loadings. The third stage involved sequentially assigning the items (from highest to the lowest factor loading) to each of three parcels in order to equalise the average loadings of each parcel onto its respective latent factor. In the final stage, the items in each parcel were averaged to produce a total score for each parcel that represented the latent variable. The parcels were then used in the SEM analysis to estimate their respective latent variable. This parcelling technique is commonly used in studies that use SEM in body image research (Augustus-Horvath & Tylka, 2009; Tylka et al, 2011b). For disordered eating behaviours two parcels were created using the total scores of the dieting and food preoccupation EAT-26 subscales. For each latent variable representing the different perceived sociocultural pressures i.e. media, family, friends and partners, two parcels were used, which comprised of the two items which related to each respective sub-scale.

### **3. Results**

#### **3.1. Preliminary Analyses**

Data were examined for normality of distribution. The presence of skewness or kurtosis can violate the data assumptions required to conduct SEM. Therefore it is recommended that variables should be transformed for absolute values of skewness  $> 3$  and kurtosis  $> 10$  (Kline, 2005). In the current study skewness and kurtosis values for all variables were lower than these values (skewness range =  $-0.21$  to  $1.24$ , kurtosis range =  $-0.54$  to  $1.71$ ). Therefore, no variable was transformed. There was no evidence of multicollinearity (i.e. all variables showed tolerance values  $> .1$  and VIF values  $< 5$ ).

Five participants failed to answer the validity question correctly; therefore those responses were deleted. Missing data accounted for no more than 0.5% of all variables and the pattern of missing data was missing at completely random (Little's MCAR test= chi-square = 4430.605 (df = 4738;  $p < .99$ ). No significant differences were identified on any of the variables when participants who had missing data were compared to those without missing data. When missing data accounts for less than 5% of the total and is missing in a random pattern, "almost any procedure for handling missing values yields similar results" (Tabachnick & Fidell, 2007, p. 63). Therefore multiple imputation was used to create a complete database (Sterne et al, 2009). Variable mean total scores, standard deviations, and bivariate correlations are presented in Table 1.

The mean total scores showed that women in the current study report reported elevated levels of body image dissatisfaction (on both measures: CARVAL= 3.27 and MBSRQ-AE= 2.94). Compared to previous research using the same measures with adult women, women in the current study reported similar levels of body image dissatisfaction on the CARVAL (Moss & Rosser, 2012: mean=3.28) and slightly lower levels of body image dissatisfaction on the MBSRQ-AE (Cheng & Mallinckrodt, 2009: mean= 3.28; Schaefer, Thibodaux, Krenik, Arnold & Thompson, 2015: mean= 3.24). Women also reported elevated levels of internalisation of the thin ideal (mean=2.94) which were similar or slightly lower than previous research (Huxley et al, 2014: mean= 3.02; Johnson, et al, 2014: mean=3.26). Women reported moderately low levels of body appreciation (mean=2.22), which were lower than previous research (Swami, von Nordheim & Barron, 2016: mean= 2.70; Tylka, Calogero & Daniélsdóttir, 2015: mean=3.22). Women reported experiencing high levels of media pressure to be thin (mean=3.44), whereas pressures from friends (mean=1.94), family (mean= 1.97) and partners (mean= 1.83) were at a moderate level. This is consistent with previous research (Huxley et al, 2014: media pressure

mean=3.77, friend pressure mean=1.80, family pressure mean=1.94, partner pressure=2.04; Johnson et al, 2015: media pressure mean=3.14). Women reported moderate to elevated levels of bulimic (mean=2.11) and dieting (mean=2.72) behaviours respectively, which indicated some disordered eating behaviour but not at the level of a clinical eating disorder. These disordered eating scores are slightly higher than previous research with adult women (Oney, DePaulo, Lewis & Sellers, 2015: bulimic behaviours (mean=1.99) and dieting behaviours (mean= 2.07). Women reported moderate levels of body image inflexibility (mean=3.10), which was slightly higher than previous research (means ranged from 2.61-2.81 in Callaghan et al's study, 2015). Overall the women in the current study scored within the expected range on all of the study measures.

All measured variables were positively correlated with each other ( $p < .01$ ). BMI was significantly correlated with all measured variables, apart from body image inflexibility and bulimia. BMI showed significant *positive* correlations with all measured variables except for internalisation of the thin ideal which had a significant *negative* correlation with BMI. This indicated that as BMI increased, internalisation of the thin ideal decreased.

Age was significantly correlated with all measured variables apart from negative body image (CARVAL) and family pressure to be thin. Age showed significant *negative* correlations with pressure from friends, partners and the media, internalisation, body image inflexibility, bulimia and dieting behaviours, indicating that as age increased the scores on these variables decreased. Age was found to have significant *positive* correlations with BMI, negative body image (MBSRQ-AE) and lack of body appreciation. This indicated that as Age increased, these variables also increased.

Table 1. Variable mean total scores (standard deviations) and correlations among measures, Age and BMI.

	<i>M</i>	<i>SD</i>	Range	BMI	Age	PSPS-Friend	PSPS-Partner	PSPS-Media	PSPS-Family	SATAQ-3-I	MBSRQ-AE	CARVAL	BAS-2	BIPIS	EAT-26 Dieting	EAT-26 Bulimia
BMI	24.07	4.77	12.55-40.00	—	.35**	.16**	.09*	.10*	.28**	-.16**	.41**	.32**	.30**	.05	.15**	.08
Age	31.01	11.98	18- 65	.35**	—	-.09*	-.11*	-.10*	.01	-.30**	.14**	.08	.13**	-.22**	-.09*	-.18**
PSPS- Friend	1.94	.909	1 – 5	.16**	-.09*	—	.46**	.39**	.56**	.29**	.21**	.26**	.22**	.33**	.34**	.33**
PSPS- Partner	1.83	.924	1 – 5	.09*	-.11*	.46**	—	.28**	.41**	.28**	.22**	.21**	.21**	.31**	.32**	.33**
PSPS- Media	3.44	1.14	1 – 5	.10*	-.10*	.39**	.28**	—	.32**	.45**	.22**	.28**	.28**	.39**	.44**	.27**
PSPS- Family	1.97	1.05	1 – 5	.28**	.01	.56**	.41**	.32**	—	.21**	.27**	.31**	.22**	.30**	.31**	.30**
SATAQ-3-I	3.05	0.95	1 – 5	-.16**	-.30**	.29**	.28**	.45**	.21**	—	.20**	.29**	.28**	.54**	.45**	.34**
MBSRQ-AE (reverse scored)	2.94	0.84	1 – 5	.41**	.14**	.21**	.22**	.22**	.27**	.20**	—	.83**	.79**	.49**	.33**	.29**
CARVAL	3.27	0.90	1 – 5	.32**	.08	.25**	.21**	.28**	.30**	.29**	.83**	—	.81**	.60**	.37**	.30**
BAS-2 (reverse scored)	2.78	0.77	1 – 5	.30**	.13**	.22**	.21**	.28**	.22**	.28**	.79**	.81**	—	.57**	.32**	.25**
BIPIS	3.10	1.13	1 – 7	.05	-.22**	.33**	.31**	.39**	.30**	.54**	.49**	.60**	.57**	—	.54**	.50**
EAT-26 Dieting	2.72	0.86	1 – 5	.15**	-.09*	.34**	.32**	.44**	.31**	.45**	.33**	.37**	.32**	.54**	—	.66**
EAT-26 Bulimia	2.11	0.80	1 – 5	.08	-.18**	.32**	.33**	.27**	.30**	.34**	.29**	.30**	.25**	.50**	.66**	—

NB: PSPS = Perceived Sociocultural Pressures Scale, SATAQ-3-I= Sociocultural Attitudes Toward Appearance Questionnaire 3-Internalisation subscale, MBSRQ-AE= Multidimensional Body-Self Relations Questionnaire- Appearance Evaluation subscale, CARVAL= Centre for Appearance Research Valence Scale, BAS-2= Body Appreciation Scale 2, BIPIS= Body Image Psychological Inflexibility Scale, EAT-26= Eating Attitudes Test-26. \*\*= Correlations significant at  $p < .01$ , \*= Correlations significant at  $p < .05$

## **Test of the hypothesised model in Figure 2**

The number of participants (N=387) was greater than the minimum 5:1 cases-to-parameter required to effectively examine a model (Bentler, 1990). Since there were 58 parameters in the model, a minimum of 295 participants were required. AMOS version 22 (Arbuckle, 2013) with maximum likelihood estimation was used to analyse all models. Model fit was determined using three fit indices outlined by Hu and Bentler (1999): the Comparative Fit Index (CFI), the Standardized Root Mean Square Residual (SRMR) and the Root Mean Square Error of Approximation (RMSEA). CFI values of .95 and higher, SRMR values of .08 or lower and RMSEA values of 0.6 and lower indicate a good fit of the model to the data. Multiple fit indices were used together because they provide a more conservative and reliable approach to the evaluation of model fit than providing evidence of only a single fit index (Meyer, & Brown, 2013).

### **3.2. Examination of the measurement model**

First, confirmatory factor analysis was conducted to analyse the measurement model, with parcels as indicators for their respective latent variable (Appendix N). It provided an acceptance-to- good fit to the data (CFI= .96, SRMR= .04 RMSEA= .07),  $\chi^2$  (125, N=387) =360.77,  $p < .001$ . All parcels loaded significantly ( $p < .001$ ) on their respective latent factor, indicating that all latent factors were appropriately operationalised.

For the latent variable representing body image, each parcel-factor loading was significant, all  $ps < .001$  and loadings ranged from .88 to .93. For the other latent variables, each parcel-factor loading was significant, all  $ps < .001$ . Loadings ranged from .84 - .91 for pressure from family, .82 - .93 for pressure from partners, .85 – .79 for pressure from the media and loadings were .77 - .82 for pressure from friends. Loadings were .90 to .94 for body image inflexibility, .87 to .95 for internalisation of the thin ideal, and .76 to .88 for

disordered eating behaviours. This measurement model was therefore used to test the hypothesised structural model in Figure 2.

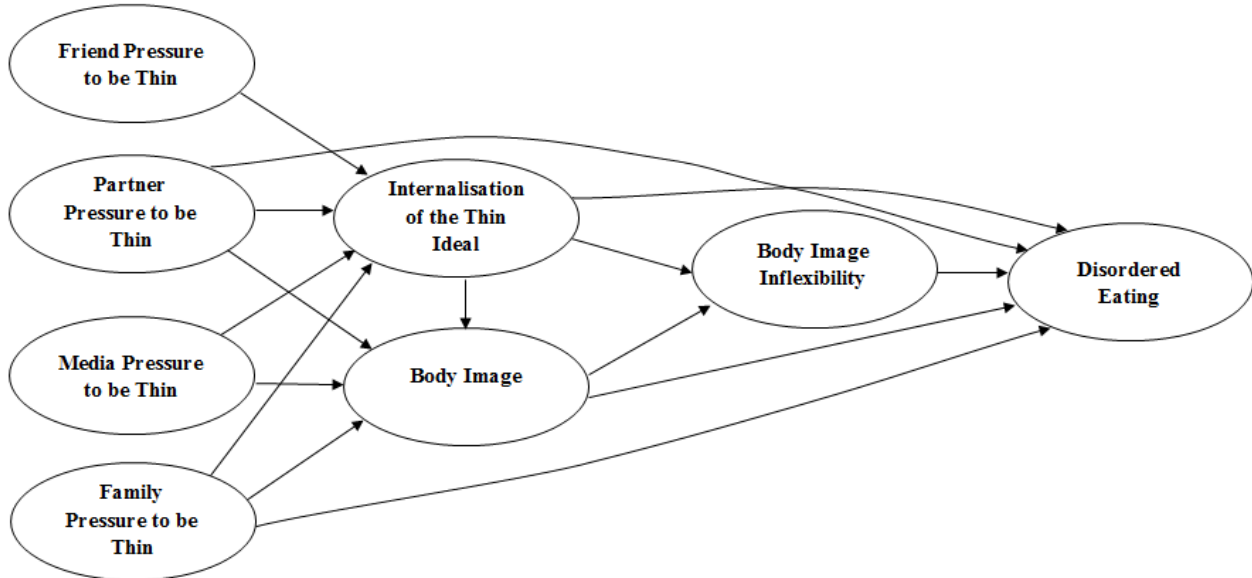


Figure 2. The hypothesised adapted Tripartite Influence Model with the inclusion of body image inflexibility

### 3.3. Examination of the structural model

1. In order to test both study hypotheses the structural model (Figure 2) was then tested. Previous research has identified a number of amendments to the Tripartite Influence Model when it has been tested with adult women (Huxley, et al, 2014; Johnson, Edwards & Gidycz, 2014; Rodgers, Chabrol, & Paxton, 2011; Van den Berg, Thompson, Obremski-Brandon & Covert, 2002; Yamamiya, Shroff & Thompson, 2008). The aim of SEM to ascertain a model that is consistent with theory and best fits the data while also remaining parsimonious (Byrne, 2013). Therefore in order to not overcomplicate the model tested in the current study, only a selection of amendments identified in previous research were added to the model. If the initial hypothesised model tested would result in a poor fit, other



amendments identified in previous research would then be considered to be added to the model.

The additional pathways added to the model were chosen based on previous research that tested the model with samples of women who had a similar average age to those in the current study (i.e. women whose average age was in their thirties) (Huxley et al, 2014). This resulted in an adapted Tripartite Influence Model with an additional source of sociocultural pressure from dating partners being added to the model, in addition to pathways from partner pressure to: internalisation of the thin ideal, body image, and disordered eating. Direct pathways from internalisation of the thin ideal to disordered eating and from family pressure to disordered eating were also added to the model (Huxley et al, 2014).

The structural model outline in Figure 2 showed an acceptable- to-good fit to the data (CFI=.96, SRMR= .05, RMSEA=.07),  $\chi^2$  (132, N=387) =381.87,  $p < .001$ ). However not all pathways were significant. Pressure from friends did not predict internalisation ( $\beta = .06$ ,  $t$  (386) = .63,  $p = .53$ ). Pressure from family did not predict internalisation ( $\beta = -.05$ ,  $t$  (386) = -.65,  $p = .52$ ). Pressure from partners did not predict body image ( $\beta = .03$ ,  $t$  (386) = .40,  $p = .69$ ). Body image did not predict disordered eating behaviours ( $\beta = .04$ ,  $t$  (386) = .57,  $p = .57$ ).

All other pathways were significant in Figure 2. The paths from partner pressure to be thin to disordered eating, from family pressure to disordered eating, from partner pressure to internalisation, from internalisation to body image and from media pressure to body image were significant at  $p < .05$ . The paths from family pressure to body image and from internalisation to disordered eating were significant at  $p < .01$ . All remaining pathways were significant at  $p < .001$ .

2. The non-significant pathways were then deleted and the model was re-examined in order to establish a parsimonious model. The trimmed model did not differ in fit compared to the original model (CFI= .96, SRMR= .05, RMSEA=.06),  $\chi^2$  (136, N=387) =382.89,  $p < .001$ ).  $\chi^2$  difference (7, N=386)= 1.02,  $p = .90$ . The trimmed model was therefore retained.

3. Modification indices (MIs) were then explored to ascertain if the data had identified any paths that should be added to the model (Kline, 2005). Large modification indices are those over 3.84. Two modification indices with large MIs (those over 3.84) were identified: the path from friend pressure to body image inflexibility (MI: 6.34) and the path from media pressure to disordered eating (MI: 4.82). These pathways were therefore included in the model one at a time and the estimates and fit indices were re-checked. The revised model (CFI= .96, SRMR=.04, RMSEA=.07),  $\chi^2$  (134, N=386) =364.96,  $p < .001$ ) provided a significantly better fit than the trimmed model without the two additional paths,  $\chi^2$  difference (2, N=387)= 17.93,  $p < 0.001$ . The revised model was therefore retained.

4. During this process of adding the additional pathways from the MIs, two paths in the revised model became insignificant: the path from internalisation of the thin ideal to disordered eating behaviours ( $p = .12$ ) and the path from family pressure to disordered eating ( $p = .19$ ). These paths were therefore deleted. The revised model (CFI= .96, SRMR=.04, RMSEA=.07),  $\chi^2$  (136, N=387) =368.75,  $p < .001$ ) provided a significantly better fit than the trimmed model with the two non-significant paths,  $\chi^2$  difference (2, N=386) = 3.79,  $p = 0.15$ . The revised model was therefore retained.

5. In a post hoc analysis, the revised model was evaluated against a model that included BMI. The correlations showed that BMI was positively related to pressures from friends, media and family, all of the body image measures (e.g. MBSRQ-AE, CARVAL and BAS-2) and the dieting subscale (see Table 1). BMI was also found to be negatively related

to internalisation. Therefore paths from BMI to friend pressure, media pressure, family pressure, internalisation, body image and dieting behaviours were added to the model. This extended model including BMI, (CFI= .96 SRMR=.04 RMSEA=.07),  $\chi^2$  (151, N=387) =408.618,  $p < .001$ ), showed a significantly worse fit to the data than the revised model without the BMI paths,  $\chi^2$  difference (15, n= 387) = 39.87,  $p < .001$ . The revised model (without the BMI paths) was therefore retained.

6. In a further post hoc analysis, the revised model was then evaluated against a model that included Age. The correlations indicated that Age significantly correlated with all of the measures in the model apart from family pressure. Therefore paths were added from Age to friend pressure, media pressure, partner pressure, internalisation, body image and disordered eating. This extended model including Age, (CFI= .96 SRMR=.04 RMSEA=.07),  $\chi^2$  (148, N=387) =399.196,  $p < .001$ ), showed a significantly worse fit to the data than the revised model without the Age paths,  $\chi^2$  difference (12, n= 387) = 30.45,  $p < .001$ . The revised model (without the Age paths) was therefore retained, since it was more parsimonious and it had a better fit than the model with the Age paths. This final model is presented in Figure 3.

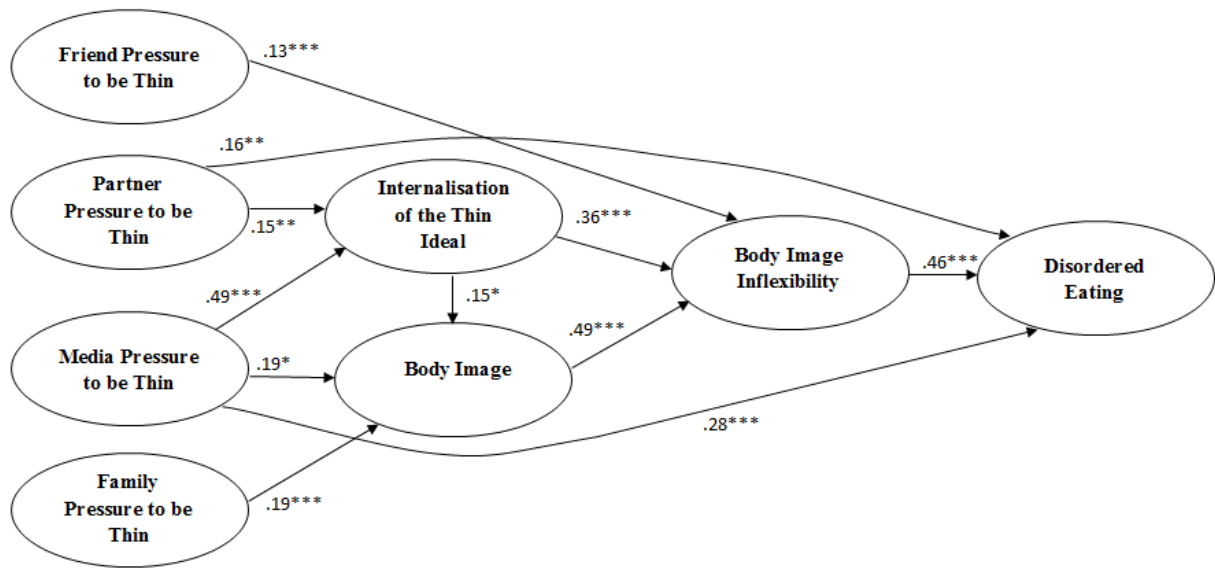


Figure 3. Final single body image inflexibility pathway model with non-significant paths deleted and significant paths added. The model assumed bidirectional relationships between the four sources of pressure. Path coefficients are provided. \* $p < .05$ , \*\* $p < .01$ , and \*\*\* $p < .001$ .

In the final model, partner pressure to be thin,  $\beta = .15$ ,  $t(386) = 2.78$ ,  $p < .01$  and media pressure to be thin  $\beta = .49$ ,  $t(386) = 8.58$ ,  $p < .001$ , predicted 31% of the variance in internalisation of the thin ideal. Internalisation of the thin ideal  $\beta = .15$ ,  $t(386) = 2.35$ ,  $p < .05$ , media pressure to be thin  $\beta = .19$ ,  $t(386) = 2.55$ ,  $p < .05$  and family pressure to be thin  $\beta = .19$ ,  $t(386) = 3.19$ ,  $p < .01$ , accounted for 17% of the variance in women's body image. Internalisation of the thin ideal  $\beta = .38$ ,  $t(386) = 9.01$ ,  $p < .001$ , friend pressure to be thin  $\beta = .13$ ,  $t(386) = 2.77$ ,  $p < .01$ , and body image  $\beta = .49$ ,  $t(386) = 11.52$ ,  $p < .001$  predicted 58% of the variance in body image inflexibility. Partner pressure to be thin  $\beta = .16$ ,  $t(386) = 2.98$ ,  $p < .01$ , media pressure to be thin  $\beta = .28$ ,  $t(386) = 4.62$ ,  $p < .001$ , and body image inflexibility  $\beta = .46$ ,  $t(386) = 7.27$ ,  $p < .001$  accounted for 50% of the variance in disordered eating.

### 3.4. Mediation Analysis

In order to explore the mediational relationships within the model and to test hypothesis 1 and hypothesis 2, a mediation analysis was conducted.

**Hypothesis 1:** When body image inflexibility is added to the Tripartite Influence Model, body image inflexibility will mediate the relationship between body image and disordered eating.

**Hypothesis 2:** When body image inflexibility is added to the Tripartite Influence Model, body image inflexibility will mediate the relationship between internalisation of the thin ideal and disordered eating.

The significance of the indirect effects of the sources of pressure on disordered eating behaviours via the mediating effects of internalisation, body image and body image inflexibility was estimated using Shrout and Bolger's (2002) bootstrap procedures. Amos was instructed to create 10,000 bootstrap samples from the data set by random sampling with replacement and generate indirect effects and bias-corrected confidence intervals (CIs) around the indirect effects when analysing the final structural model. This type of mediation method has been found to be one of the most reliable and powerful for testing the significance of the direct, indirect and total effects (Hayes, 2009). If the interval between the lower and the upper bound of the 95% bias corrected confidence intervals do not include zero, the effect is considered statistically significant ( $p < .05$ ) (Kline, 2005). For each test of mediation, a predictor– criterion direct path was added to the model and it was compared with the direct path included against the final structural model without this direct path. All indirect effects investigated were significant; this indicates mediation for indirect paths. The

presence of a significant direct path in the model determined whether there was partial or full mediation. For example, an insignificant direct path reflected full mediation and a significant direct path indicated partial mediation. Table 2 provides the results for each test of mediation (standardised indirect effects and associated level of significance, bias-corrected 95% CIs, direct effects and the type of mediation).

Both indirect effects from partner pressure and from media pressure to body image inflexibility via internalisation of the thin ideal were significant, while the direct paths were not. This indicates that internalisation fully mediated these paths. Internalisation also fully mediated the path from partner pressure to body image. Internalisation only partially mediated the path from media pressure to body image, since the direct effect was also significant.

Body image fully mediated the paths from media pressure and family pressure to body image inflexibility. Body image partially mediated the path from internalisation to body image inflexibility.

Lastly, body image inflexibility fully mediated the path from friend pressure to disordered eating. Body image inflexibility also fully mediated the relationship between internalisation and disordered eating and between body image and disordered eating.

Table 2

*Tests of Mediation: examination of indirect effects, bias-corrected 95% confidence intervals (CIs), and significance of direct paths*

Indirect path	Indirect effect ( $\beta$ )	95% confidence intervals (CIs)	Direct path significant?	Full or partial mediation
Partner Pressure $\rightarrow$ Internalisation $\rightarrow$ Body Image Inflexibility	.07**	.02 to .12	No	Full
Partner Pressure $\rightarrow$ Internalisation $\rightarrow$ Body Image	.02*	.003 to .06	No	Full
Media Pressure $\rightarrow$ Internalisation $\rightarrow$ Body Image Inflexibility	.30***	.21 to .39	No	Full
Media Pressure $\rightarrow$ Internalisation $\rightarrow$ Body Image	.07*	.01 to .15	Yes	Partial
Media Pressure $\rightarrow$ Body Image $\rightarrow$ Body Image Inflexibility	.09*	.02 to .16	No	Full
Family Pressure $\rightarrow$ Body Image $\rightarrow$ Body Image Inflexibility	.09*	.02 to .17	No	Full
Friend Pressure $\rightarrow$ Body Image Inflexibility $\rightarrow$ Disordered Eating	.06*	.01 to .12	No	Full
Internalisation $\rightarrow$ Body Image Inflexibility $\rightarrow$ Disordered Eating	.16***	.10 to .23	No	Full
Internalisation $\rightarrow$ Body Image $\rightarrow$ Body Image Inflexibility	.07*	.01 to .14	Yes	Partial
Body Image $\rightarrow$ Body Image Inflexibility $\rightarrow$ Disordered Eating	.23***	.15 to .31	No	Full

NB: The indirect effect estimate is standardised. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

## 4. Discussion

*This study involved the conceptualisation, design and implementation of new knowledge at the forefront of investigating body image inflexibility in relation to disordered eating. This included adjusting the project design in light of emergent issues and understandings.* Specifically, this study contributed to the literature by being the first to integrate body image inflexibility within the established Tripartite Influence Model of disordered eating (Thompson, et al, 1999). The results identified that body image inflexibility was a key mediational process variable that explained some of the key relationships between sociocultural pressures to be thin, internalisation of the thin ideal, body image and disordered eating. The tested model explained 50% of the variance in

disordered eating and identified that body image inflexibility was an important emotion regulation process variable for understanding the development of disordered eating in women. The relationships identified in the adapted Tripartite Influence Model tested in this current study will now be outlined and RFT will be used to provide further detail in relation to *how* these relationships might occur.

Overall the current study provides support for an adapted Tripartite Influence Model with the inclusion of body image inflexibility. The results showed support for the study hypotheses and the majority of the hypothesised paths in the Tripartite Influence Model were found to be significant. Each source of pressure contributed to one of two model variables but they were not uniquely related to the three of the hypothesised variables (internalisation of the thin ideal, body image and disordered eating). Primarily, the model showed one main pathway to women's engagement in disordered eating. Body image inflexibility had the key mediational role, which fully explained the relationships between body image, internalisation of the thin ideal and friend pressure to be thin, to women's disordered eating. Therefore, when body image inflexibility was added to the Tripartite Influence Model, the previously established direct relationships between body image and disordered eating, between internalisation and disordered eating and between friend pressure and disordered eating were no longer significant. However internalisation of the thin ideal and body image did have key mediational roles connecting the different sociocultural pressures to body image inflexibility. Two other significant direct paths were also found from partner pressure and from media pressure to disordered eating behaviours.

#### **4.1. Body image inflexibility**

One of the main findings identified that body image inflexibility fully mediated the relationship between body image and disordered eating. Therefore the key pathway in the



original Tripartite Influence Model, the direct pathway from body image to disordered eating was not significant when body image inflexibility was included in the model (Gowers & Shore, 2001; Huxley, et al, 2014; Johnson, Edwards & Gidycz, 2014; Rodgers, Chabrol, & Paxton, 2011; Van den Berg, Thompson, Obremski-Brandon & Covert, 2002). From an RFT perspective, disordered eating can be explained in terms of an individual getting stuck or entangled in negative eating and body image cognitions or relational frames (rather than allowing and accepting these difficult experiences). Fusion with negative body image-related language and conditioned responses can cause significant distress. Women may therefore engage in disordered eating behaviours as a way of attempting to relieve this distress, since they believe that these behaviours may help them achieve a body closer to the thin ideal. This suggests that disordered eating is not just the result of negative body image cognitions, but also the extent to which women become stuck and preoccupied with these inner experiences. This is consistent with previous research conducted by Ferreira et al (2014) which found that body image-related cognitive fusion (a measure of body image psychological inflexibility) mediated the relationship between body image dissatisfaction and disordered eating and between upward appearance comparisons with media ideals and disordered eating.

#### **4.2. Internalisation of the thin ideal**

The results showed that internalisation of the thin ideal retained its hypothesised mediation roles between both partner pressure and media pressure and disordered eating. This provides further support for the importance of internalisation of the thin ideal in influencing disordered eating. However internalisation of the thin ideal was not significantly associated with peer or family pressure in the model. The hypothesised path from internalisation of the thin ideal to disordered eating identified in previous research was also

not found to be significant (Huxley et al, 2014; Thompson & Stice, 2001). This might be explained by the mediational analysis results which identified that when body image inflexibility was included in the model, the direct path from internalisation to disordered eating was no longer significant. Body image inflexibility therefore fully mediated the relationship between internalisation and disordered eating. It appears that internalisation of the thin ideal does influence disordered eating but only through its relationship with body image inflexibility. For example, higher levels of internalisation of the thin ideal, increases the levels of body image inflexibility which then increases the likelihood of disordered eating. Therefore women may well internalise the thin ideal, however this needs to lead body image inflexibility for internalisation of the thin ideal to influence disordered eating.

The results also identified important roles of the different sources of sociocultural pressures within the adapted Tripartite Influence Model.

#### **4.3. Partner pressure to be thin**

The adapted Tripartite Influence Model in the current study included an additional source of sociocultural pressure ‘perceived partner pressure to be thin’, consistent with previous research with adult women (Huxley, et al, 2014; Johnson, Edwards & Gidycz, 2014; Rodgers, Chabrol, & Paxton, 2011; Van den Berg, Thompson, Obremski-Brandon & Covert, 2002). The hypothesised paths from partner pressure to internalisation of the thin ideal and from partner pressure to disordered eating were found to be significant. This supports previous research which found that for heterosexual women, male partner pressure directly impacted restrained eating behaviours (Halliwell & Dittmar, 2006; Huxley et al, 2014). It seems reasonable that when women perceive pressure to be thin from their partners, this pressure may directly increase their engagement in disordered eating behaviours. Women may therefore make attempts to become thinner, in order to be perceived as more

attractive by their partner. From an RFT perspective, partners might place direct pressure on women to be thin by making comments about their weight gain or about women's beauty in general based on thinness. Or indirectly through derived relational framing, for example a man may respond to a photo of a thin woman with positivity in front of his girlfriend. The girlfriend might then derive that their partner would experience the same positivity if they themselves were thin i.e. transformation of positivity-thin functions from the picture to oneself might take place. This may then unintentionally place pressure on a woman to be thin. The related conditioned responses such as feelings of shame or anxiety might then be instigated. A woman might then engage in disordered eating in an attempt to avoid/reduce the distressing feelings.

A similar finding of the importance of partner pressure on disordered eating has also been found in research with adult men (Tylka, et al, 2011b). It seems partner pressure is an important variable to consider when predicting disordered eating, for both adult women and men.

#### **4.4. Media pressure to be thin**

Media pressure was identified as an important sociocultural pressure, with women reporting nearly twice as much media pressure compared to the other sociocultural pressures to be thin (see Table 1, variable mean total scores). This finding is consistent with previous research with adult women (Huxley et al, 2014; Johnson et al, 2014). Similarly, the hypothesised path from media pressure to body image was found to be significant and an unanticipated path was also identified from media pressure to disordered eating. This supports previous research that has identified media pressure as an important predictor for disordered eating in women (Huxley et al, 2014; Johnson et al, 2015; McCabe, et al, 2007; Slevec & Tiggemann, 2011a). From an RFT perspective, a woman may watch a TV

programme that reinforces the thin ideal such as showing a character in a TV series becoming successful in work after she has lost a lot of weight. She might then engage in deictic and comparative relational frames whereby she compares her own body with that of the TV actress. If she infers that she is bigger than the actress (which is likely since actresses are on TV often because their appearance reflects the thin ideal), that might elicit feelings of body image dissatisfaction. The woman may then engage in disordered eating behaviours to attempt to lose weight in order to become closer to the thin ideal to reduce her experienced distress.

#### **4.5. Friend pressure to be thin**

Previous research has shown mixed results for the role of *friend pressure to be thin* within the Tripartite Influence model. Some studies have identified a link (Johnson, et al, 2014; Rodgers, et al, 2011; Van den Berg, et al, 2002; Yamamiya et al, 2008) and others have not (Huxley et al, 2014). In the current study, friend pressure to be thin had a significant positive relationship with internalisation of the thin ideal, as per the tenets of the Tripartite Influence Model. From an RFT perspective, women may perceive pressure from their friends to be thin when friends directly encourage them to lose weight or praise celebrities for their thinness. Or through derived relational framing for example a friend might say how beautiful a model is in a magazine after they have lost weight. The other friend might then derive that their friend would also think that they were beautiful if they themselves lost weight i.e. transformation of beautiful-thin functions from the magazine to oneself might take place. This perceived pressure may reinforce already established relational frames related to equating beauty with thinness, which will in turn condition women to internalise the thin ideal to a greater extent.

It was also identified that body image inflexibility fully mediated the relationship between friend pressure and disordered eating. This suggests that perceiving pressure from friends to be thin may lead to more rigid and inflexible body image-related cognitions and behaviours governed by negative appearance-related relational frames, which then increases the likelihood of disordered eating.

An additional unanticipated positive relationship was also identified which linked perceived friend pressure to be thin with body image inflexibility. These findings suggest that pressure from friends to be thin might be associated with increased body image inflexibility. Women may experience direct pressure from their friends to be thin such as engaging in 'fat talk' with their friends (e.g. when women discuss or comment on their own or others appearance which reinforces the thin ideal) (Nichter, 2000). From an RFT perspective, women may also experience indirect pressure to be thin from friends through derived relational framing. For example, peers may use language that is part of a woman's relational frame network which when a woman hears these words, she relates them to other negative eating/body image related cognitions. The activation of this negative relational frame may then result in a conditioned response such as shame. Friend pressure may then influence women to become more rigid and inflexible about the way in which they process negative appearance-related thoughts and emotions. Since two significant paths were identified in the model from friend pressure, it indicates that friends are still an important source of pressure and contextual frame for understanding disordered eating, even for adult women.

#### **4.6. Family pressure to be thin**

Family pressure to be thin was found to have a significant relationship with body image. Family members might directly place pressure on women to have a thin body (such

as encouraging her to lose weight) or indirectly when family members use language that is part of a woman's negative body image-related relational frame. For example a mother and daughter might be watching a TV series and the mother may respond negatively to an actress who has put on weight and describes her as fat. The daughter might engage in deictic and comparative relational frames whereby she compares her own body with that of the TV actress. If the daughter infers that she is bigger than the actress, feelings of body image dissatisfaction might be elicited.

The pathway from family pressure to internalisation of the thin ideal that was in the original Tripartite Influence Model was not found to be significant. Also the direct pathway from family pressure to disordered eating identified in previous research was not found to be significant (Huxley et al, 2014). Although some of the family pressure pathways were not retained in the final model, the path from family pressure to body image was significant. This indicates that family pressure is still an important factor that influences women's disordered eating behaviours in the model.

#### **4.7. BMI**

Despite BMI correlating positively with body image, body image inflexibility and disordered eating, it was interesting to note that the model fit deteriorated when BMI was added to the model. This might be explained by the average BMI of the sample falling within the normal range. Previous research has identified that among women with lower BMI, greater body image flexibility was a protective factor against disordered eating behaviours (Hill et al, 2013). However this relationship was not identified for women with normal or higher BMIs (Kelly, Vimalakanthan & Miller, 2014; Masuda, Hill, Tully & Garcia, 2015; Wendell et al, 2012). Therefore BMI might not be as important for explaining disordered eating for women who fall within the normal BMI range.

The findings from the current study, along with related previous research may also suggest that the relationship between BMI and body image flexibility is not linear. For example BMI might only have a significant relationship with body image inflexibility for individuals who have a low or high BMI. Future research could investigate whether the adapted Tripartite Influence Model outlined in this study (with the inclusion of body image inflexibility) differs between different BMI groups (i.e. underweight, normal, overweight and obese). This could ascertain whether BMI has more influence in the model for certain BMI groups. The majority of participants in the current study fell within the ‘normal’ BMI range, with very few participants representing any other BMI categories. Splitting participants into BMI groups was therefore not possible, since this would have resulted in the other smaller BMI groups having insufficient power for the latent variable SEM analysis.

Another issue to consider when measuring BMI is whether self-report BMI measurement is accurate. It might be the case that participants do not accurately know their height or weight and therefore misreport these details or purposely provide inaccurate details in order to conform to body image ideals (e.g. women may report that they weigh less, due to feeling ashamed of weighing more than the ‘ideal’). Therefore future studies might wish to include an objective measure of BMI such as researchers’ measuring participant’s height or weight in addition to self-report measures.

#### **4.8. Age**

Age significantly correlated with all of the measured variables apart from family pressure in this study. However when Age was added to the final model, the model fit significantly deteriorated. This suggests that the variables and pathways outlined in the adapted Tripartite Influence Model influenced the disordered eating behaviours of women in this study regardless of their age. Consistent with the findings of the current study, the

Tripartite Influence Model has been found to be relevant for explaining disordered eating in women across the lifespan (Huxley, et al, 2014; Johnson, et al, 2014; Lewis-Smith, et al, 2016; Rodgers, et al, 2011; Van den Berg, et al, 2002; Yamamiya, et al, 2008). Therefore it could be ascertained from these findings that once the variables and pathways outlined in the final model were considered, age was less important for explaining women's disordered eating behaviours.

An alternative explanation could be related to the average age of women in the study. For example the average age of women was at the lower end of the age range (M=31.01, age range= 18 - 65). This has the potential to lessen the overall impact of age in the model. In the current study, it was not possible to split up participants into age groups in order to compare the model with the groups. This was due to the large sample size required to achieve sufficient power for the analysis (i.e. a minimum of 295 participants were required to test the model). However it would be interesting in future research to recruit a sufficient number of female participants in a range of age groups, in order to test the final model. This would be able to ascertain whether the variables and pathways in the model differ depending on a woman's age group.

#### **4.9. Applying the findings to psychological interventions for disordered eating**

The current study provides support for the adapted version of the Tripartite Influence Model tested in this study with adult women. These findings can contribute to the body of theoretical research which aims to understand the factors and mechanisms which influence disordered eating behaviours. However the findings also have the potential to inform future interventions that aim to treat or prevent women's disordered eating. Through testing the adapted Tripartite Influence Model, the findings of the current study have highlighted a number of key variables that future interventions could target. Sociocultural pressures to be



thin, internalisation of the thin ideal, body image and body image inflexibility were all identified as important variables that contribute to disordered eating either directly or indirectly.

Previous research has found that media literacy programs which aim to challenge sociocultural pressures of media ideals have been found to significantly reduce internalisation of media ideals, body image dissatisfaction, dieting, and shape and weight concerns compared to control group in adolescent girls and boys (Wilksch, Tiggemann, & Wade, 2006). However less is known about the effectiveness of media literacy programmes for adult women.

Similarly, previous research which has investigated the effectiveness of interventions for women that target internalisation of the thin ideal, sociocultural pressures to be thin and body image dissatisfaction such as cognitive dissonance programmes have been found to produce significant improvements on measures of internalisation of the thin ideal, body image, dieting, and bulimic symptomatology, compared to control groups (Becker et al, 2010; Stice, Shaw, Burton, & Wade, 2006; Stice et al., 2008). The findings from the current study provide further support for targeting these key risk factors outlined in the Tripartite Influence Model.

Body image inflexibility was also identified as a key mediating variable that predicted disordered eating behaviours. From these results it might be cautiously inferred that internalisation of the thin ideal and body image precede body image inflexibility in the psychological process that leads to the rigid and inflexible cognitions and behaviours to control weight and shape. Therefore, it is plausible that body image inflexibility is a possible of reaction to internalising the thin ideal and experiencing negative body image, which in turn leads to disordered eating. When the person becomes preoccupied with their negative

body image cognitions and feelings, they may seek a way to overcome these inner experiences by attempting to change their weight or shape. Therefore it seems reasonable to propose that by improving women's skills at experiencing and allowing body image-related negative thoughts and feelings (i.e. increasing body image flexibility); disordered eating behaviours could be reduced. This is consistent with the key goals of Acceptance and Commitment Therapy (ACT).

#### **4.10. Acceptance and Commitment Therapy for disordered eating**

Acceptance and Commitment Therapy (ACT) is an empirically based psychological intervention that is based on Relational Frame Theory. ACT for disordered eating aims to increase body image flexibility based on the ACT Hexaflex model using acceptance and mindfulness techniques and commitment and behaviour change strategies (Pearson et al, 2010; Hayes et al, 2001, Sandoz et al, 2011). The premise of ACT is that by increasing client's body image flexibility, they will be less likely to get preoccupied with disordered eating thoughts which will help them to pursue a life that is based on their own personal values. The ACT Hexaflex Model postulates that body image flexibility is established through six core ACT processes: contacting the present moment, defusion, acceptance, self-as-context, values, and committed action (Harris, 2009). Contacting the present moment relates to consciously connecting to the present environment. Defusion means to step back or detach from our thoughts, feelings or inner experiences (rather than getting caught up in them) and letting them go. Acceptance relates to allowing or making room for difficult or unpleasant inner experiences, rather than trying to avoid or extinguish them. Self-as-context means becoming familiar with the "observing-self" i.e. allowing yourself to notice/observe your own thoughts, feelings or experiences as an observer, rather than being embodied by these inner experiences. "Values" relates to clarifying personal values that if pursued, would

allow an individual to lead a meaningful life. Committed action means taking effective action to pursue a meaningful life, informed by these personal values. These six core processes can be grouped into three main targets of ACT: *being open* (acceptance and defusion), *centred* (present-moment awareness and self-as-context), and *engaged* (values and committed action). The overarching aim of increasing body image flexibility involves people being actively *engaged* in their valued pursuits, which is assisted by *being open* to internal experience (even when these experiences are unpleasant) and *centred* in the here-and-now (Juarascio, Shaw, Forman, Timko, Herbert, Butryn & Lowe, 2013).

Acceptance and Commitment Therapy for disordered eating includes a variety of different exercises which target different aspects of the ACT Hexaflex model in order to increase levels of body image flexibility. To help individuals to become *engaged* in their valued pursuits, values clarification exercises are conducted. This allows individuals to help identify the most important aspects of their life and which areas they should spend more time cultivating (Juarascio, et al, 2013).

Pursuing a values-led life can be difficult, since it often involves facing situations and engaging in behaviours that are sometimes anxiety provoking and unpleasant. Therefore ACT also teaches skills for *being open* to these difficult inner experiences (i.e. acceptance and cognitive defusion) and *centred* in the present moment (i.e. present-moment awareness and self-as-context) when engaging in values-led life pursuits (Sandoz et al, 2011).

*Mindfulness* exercises (e.g. mindfulness of breath) encourage clients to be in the present moment and commonly involve clients closing their eyes; counting each in and out breath to the count of five and bringing their focus back to their breath when their mind wanders. Negative eating and body image cognitions are often perceived as being true (e.g. I am fat...I am unattractive). Mindfulness exercises allow clients to become more aware that these thoughts are just thoughts and not facts.

*Cognitive defusion* exercises encourage clients to let go and become less fused with these difficult inner experiences. The milk exercise is a common cognitive defusion exercise (Juarascio, et al, 2013) used with clients engaging in disordered eating. This exercise involves asking clients to quickly and repeatedly say the word ‘milk’ many times in a row. This helps individuals realise that words quickly lose their meaning when they lack context. Clients are then asked to try this technique using a sentence that relates to their appearance or eating problems (e.g. ‘my arms are fat’ or ‘food makes me fat’). This technique provides clients with a way of defusing or creating distance from difficult thoughts and feelings that they may experience when pursuing a values-led life.

Avoidance behaviours (i.e. covering up body parts with clothes or makeup) and body checking behaviours (i.e. spending a great deal of time looking at and scrutinising specific body parts) are common behaviours in people with body dissatisfaction and disordered eating. Mindfulness mirror exercises can be used to encourage individuals to develop a mindful awareness of their bodies, rather than avoiding or scrutinising specific body parts (Delinsky & Wilson, 2006). These exercises involve individuals looking at themselves in the mirror, observing each body part at a time and non-judgementally describing the body part. Clients are encouraged to mindfully observe the thoughts and feelings that arise and practice defusing from judgments and evaluations.

Overall the goal of ACT for disordered eating is to use the type of exercises previously described to reduce disordered eating by helping clients to become more psychologically flexible and live a values-led life (Juarascio, et al, 2013; Pearson, et al, 2010). By becoming less preoccupied with eating and negative body image thoughts, clients are able to pursue more meaningful life activities and experience less distress and therefore less desire to gain relief from this distress using disordered eating behaviours (Juarascio, et al, 2013; Pearson, et al, 2010).

Body image inflexibility can also create a barrier which hinders women from engaging effectively in psychological interventions which aim to treat disordered eating (Pearson et al, 2010; Sandoz, et al, 2011). For example, in ACT interventions, women may experience distress when preparing to attempt a new values-led goal such as eating a meal in front of friends. Therefore they may decide to not attempt the goal until their distress has reduced. In this example, this women's body image inflexibility has resulted in distress and unpleasant emotions and hindered her from attempting a values-led goal.

Once body image inflexibility has been identified as a barrier to ACT, other techniques such as mindfulness or defusion exercises can be employed to help reduce client's inflexibility with these distressing thoughts and emotions. This can then increase their ability to attempt a challenging values-led goal, even in the presence of uncomfortable inner experiences. Body image inflexibility is also a construct to consider when identifying and overcoming barriers to providing psychological interventions. Body image inflexibility is therefore not just a construct that is relevant to ACT interventions. It could also be equally useful as a construct to measure in order to identify barriers to adherence in other psychological interventions for disordered eating (e.g. Cognitive Dissonance programmes).

The evidence for the effectiveness of ACT for disordered eating is still in its infancy but is growing. A number of studies have shown that ACT interventions have significantly reduced disordered eating behaviours compared to control groups (Juarascio, Forman & Herbert, 2010; Juarascio, et al, 2013; Manlick, et al, 2013). However the sample sizes in these studies were small which reduces the generalisability of the findings. Overall there is a need for more research with larger sample sizes to investigate the effectiveness of interventions that aim to increase body image flexibility such ACT for disordered eating.

#### **4.11. Limitations and Directions for Future Research**

*A critical reflection on the current study and an evaluation of its strengths and weaknesses will not be outlined.* There are a number of considerations that should be noted when interpreting the results of the current study. The first relates to the cross-sectional design of this study. The results provide preliminary findings for the role of body image inflexibility within an adapted Tripartite Influence Model. The correlations provide important evidence in a limited but growing research area. However due to the cross-sectional design, no conclusions can be made in regards to causation. Longitudinal studies which analyse data collected over a number of different time points are therefore required to examine the adapted version of Tripartite Influence Model tested in this study (with the inclusion of body image inflexibility) in order to investigate the causal relationships.

The sample was relatively homogeneous, in terms of ethnicity, sexual orientation and level of education, which limits the generalisability of the results to more diverse populations of women. Future research should therefore include more heterogeneous samples. Similarly, despite a range of weights being reported in the study, the average BMI classified in the normal range. Therefore future research could explore these relationships with women with more diverse BMIs.

This study was focused on less severe levels of disordered eating behaviours (i.e. disordered eating) as opposed to diagnosable eating disorders. Women who reported BMIs or reported scores on the EAT-26 that suggested that they might be at risk of having an eating disorder were not excluded from the analysis. This was because the self-report nature of the data collection is not a reliable indicator of diagnosable eating disorders. Similarly, there could be other reasons why a person has a low BMI e.g. due to an illness, rather than the

presence of an eating disorder. The diagnosis of a formal eating disorder requires a structured clinical interview with the patient and access to the patient's medical history (Birmingham, 2015). There was no recourse to therefore verify any of these assessments. Women with eating disorders are part of the general population of women who have a particular relation to disordered eating. Although we may hypothesise that the relationships between the variables considered in this thesis are different for those with and without eating disorders, this is simply a hypothesis. A natural progression of the work contained within this thesis would be to more specifically examine the similarities and differences between those with a clinical eating disorder and those with lower levels of disordered eating.

Consistent with previous research which has tested the adapted Tripartite Influence Model with adult women, the current study asked women the extent to which they experienced pressure from family members to be thin (Huxley, et al, 2014; Johnson, et al, 2014; Van den Berg, et al, 2002). In previous research this construct tends to be broadened to family pressure (from parent pressure which adolescents are often asked) when the model is tested with adult women (Huxley, et al, 2014; Johnson, et al, 2014; Van den Berg, et al, 2002). This is due to adult women being more likely to have a wider circle of family to perceive pressure from. For example, women are more likely to have their own children compared to adolescents. Therefore they might perceive pressure to be thin from their children, in addition to other family members such as siblings or parents. However a limitation of using a broader concept of family is that there is no clarification on which family member a woman is perceiving pressure from. Also women may experience different levels of pressure to be thin from her parents compared to her siblings or her own children. Future research could provide a range of family member options (e.g. brother, sister, mother, father, son, daughter) when asking women about any potential pressure to be thin that they have received from family members. This information would provide a clearer

understanding of how family pressures to be thin influence disordered eating in the adapted Tripartite Influence Model.

Women in the current study reported nearly twice as much media pressure in comparison to the other sociocultural pressures. However a limitation of this study is that women were not asked the source of perceived media pressure. There are a wide range of different forms of media that women could experience pressure from, including the increasing pressures from social media. Future research with adult women could investigate whether certain media pressures are more salient than others for influencing disordered eating within the adapted Tripartite Influence Model tested in the current study.

Future research could also investigate body image inflexibility within an adapted Tripartite Influence Model of disordered eating for men. Although women generally report a greater range and level of disordered eating behaviours, men do still report significant disordered eating behaviours (Tylka et al, 2011b; Tylka & Andorka, 2012). Similarly a number of studies show support for a gender-specific version of the Tripartite Influence Model for disordered eating in men (including internalisation of the muscular ideal and muscular enhancement behaviours for men) (Tylka et al, 2011b; Tylka & Andorka, 2012). Research also indicates that body image inflexibility has found to be significantly associated with disordered eating in male samples (Masuda, Hill, Tully & Garcia, 2015). These findings suggest that investigating a gender-specific adapted Tripartite Influence Model with the inclusion of body image inflexibility for disordered eating in men would be worthy of future research.

One variable from the Tripartite Influence Model; upward appearance comparison, was not tested in the current study. Although data for this construct was collected, when it was included in initial model testing, the items on this scale overlapped with items in the



measure for Internalisation of the thin ideal. This caused problems (i.e. suppression effects) in the statistical analysis. Therefore the upward appearance comparison measure was not included in the analysis. This decision is consistent with previous research which tested the Tripartite Influence Model with adults and which only included a measure of Internalisation of the thin ideal and not a measure of upward appearance comparison for similar reasons. For example, in order to avoid causing problems in the analysis caused by overlap between the constructs (Huxley et al, 2014; Tylka, et al, 2011b). Additionally, Rodgers et al (2015) found that internalisation was a predictor of appearance comparisons when they tested the Tripartite Influence Model with college women. This provided further support for retaining internalisation over upward appearance comparison in the current study. However future research could test the adapted Tripartite Influence Model outlined in this study and include a measure of upward appearance comparisons. However consideration should be taken to ensure that the items in the measure of upward appearance comparison do not overlap with those in the internalisation of the thin ideal measure.

The current findings show support for the relevance of body image inflexibility within the adapted Tripartite Influence Model of disordered eating. The findings were explained conceptually in relation to RFT and derived relational framing. However no specific RFT psychometric measures were included in the current study. Deictic framing (i.e. a relation that is based on the perspective of the speaker e.g. '*I am fat and you are thin*') might be a particularly interesting frame to investigate in relation to upward appearance comparison in the Tripartite Influence Model (Hayes et al, 2001). Since both can involve comparing oneself to other people or stimuli. Future research investigating body image inflexibility and disordered eating may wish to include RFT measures to investigate the specific relational frames that women may use in relation to disordered eating and its risk factors.

#### 4.12. Conclusion

*The current study provided an independent judgement of the issues and ideas in the field of psychological inflexibility and disordered eating and these have been communicated and justified within this discussion.* The current study tested an adapted Tripartite Influence Model with the inclusion of body image inflexibility for adult women. The significance of this variable was evident in that there was a single body image inflexibility pathway to disordered eating in the final model. The established pathway from body image to disordered eating was not significant when body image inflexibility was included in the model. This might be due to the full mediational role that body image inflexibility plays between body image and disordered eating. Body image inflexibility also fully mediated the relationship between internalisation of the thin ideal and disordered eating.

The key pathways of the Tripartite Influence Model were also supported, such as the mediating roles of internalisation of the thin ideal and body image, accounting for the influence of the different sources of sociocultural pressure to disordered eating. Partner pressure and media pressure both had direct paths to disordered eating. Overall the findings indicate that body image inflexibility is a worthy variable to be investigated within theoretical models of disordered eating. These findings have implications for clinicians providing support for women with disordered eating. It is recommended that clinicians consider measuring and targeting body image inflexibility in their interventions, in addition to internalisation of the thin ideal, sociocultural pressures to be thin and body image in order to improve disordered eating symptomology.

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## Appendices

## **Appendix A: A Systematic Review of Acceptance-based Interventions for Body Image Dissatisfaction**

This **Systematic Review** has been completed, submitted, assessed and passed by the University of the West of England and BPS examination board in February 2013.

Title: A systematic review of the effectiveness of acceptance-based interventions for improving body image in adults

### **Abstract**

Body dissatisfaction is prevalent in 61% - 82% of the adult population. Experiencing such negative feelings about one's appearance can have a detrimental effect on physical and psychological well-being. In response to this, a number of psychological interventions have emerged aiming to improve levels of body satisfaction in adults. Acceptance-based techniques are one such approach. The present study is an exploratory examination of the efficacy of acceptance-based techniques for improving body image/appearance dissatisfaction. It employs a systematic review technique in which terms for acceptance-based techniques and body image were chosen and analysed. Using data obtained by the online searches of references from 16 different databases, 6 individual studies were included in the systematic review. Each study reported satisfactory results, although the quality of methods varied and sample sizes were small. Nonetheless, the current study found initial evidence supporting the effectiveness of acceptance-based interventions for improving body image satisfaction in adults. The application of acceptance-based interventions for improving body image satisfaction remains a promising approach worthy of further research.

## Introduction

Body image is defined as “one’s perceptions and attitudes in relation to one’s own physical characteristics” (Cash & Fleming, 2002, p 455). It is a construct with a number of components, usually described as cognitive, affective, behavioural and perceptual (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999). A key element of body image is body satisfaction – one’s overall appraisal of their body. Research indicates that as much as 61 – 82% of adults are dissatisfied with their appearance (Harris & Carr, 2001; Lioffi, 2003). This widespread presence of some degree of body dissatisfaction has been described as ‘normative discontent’ (Rodin, Silberstein, & Striegel-Moore, 1984) and has been shown to remain stable across age groups from people aged 20 to 60, in those without an eating disorder (Bennett & Stevens, 1996). In addition to being a predictive factor in the development of eating disorders (Keel, Dorner, Franko, Jackson & Herzog, 2005, Stice, 2002); body dissatisfaction can also cause significant distress and emotional difficulties such as anxiety (Bennett & Stevens, 1996), depression (Niemeier, 2004), low self esteem (Grossbard, Lee, Neighbors & Larimer, 2009) and poorer quality of life (Ganem & Morera, 2009) in those without a clinical eating disorder. Body image dissatisfaction can also lead to a variety of damaging health behaviours, such as the uptake of smoking (as an appetite suppressant) (Amos & Bostock, 2007), crash-dieting, vomiting, laxative and diet pill use (Wertheim et al., 1992), protein powder and steroid use (Pope, Phillips, & Olivardia, 2002) and unsafe tanning behaviours (Livingstone, White, Hayman & Dobbinson, 2007). Clearly there is a significant proportion of the adult population that is experiencing body dissatisfaction in the absence of an eating disorder which is likely to be detrimental to their physical and emotional well-being. Developing psychological interventions to reduce body dissatisfaction in this population has therefore been identified as a key area for healthcare service attention (Paxton, 2000).

Subsequently a number of psychological interventions have been developed aiming to improve body dissatisfaction. The majority of which have used a cognitive behavioural therapy (CBT) approach, based on the premise that body image dissatisfaction is the result of a disturbance in the cognitive, behavioural or emotional aspects of body image (Farrell et al, 2006). These interventions tend to include techniques such as cognitive restructuring (challenging negative body image thoughts), behavioural exercises (to test predictions about negative thoughts), size perception exercises (providing participants with feedback about the accuracy of their body sizes estimations),



decreasing avoidant behaviours, problem solving, mirror exposure and assertiveness training (Butters & Cash, 1987; Cash, 1995, Rosen, 1997; Rosen Saltzberg & Srebnik, 1989). However the overall effectiveness of such interventions is mixed (Farrell et al, 2006).

A more promising alternative to CBT interventions are cognitive dissonance techniques that have been developed by Stice and his colleagues (Stice, Shaw, Becker & Rohde, 2008). The aim of such interventions is to reduce internalisation of the thin-ideal that is often encouraged in western culture. Therapeutic activities involve listing positive physical features of the self, exploring the negative impact of thin ideal messages from the media, friends and family and writing down the consequences of pursuing the thin ideal (Stice, Shaw, Burton, & Wade, 2006). Cognitive dissonance techniques are based on Stice's (1994) dual pathway model of bulimia, which hypothesises that reducing the internalisation of the thin ideal will decrease negative affect and in turn will reduce disordered eating pathology. Dissonance-based interventions have been found to reduce body dissatisfaction and eating disorder pathology in school aged girls, at 6 month follow up (Stice, et al, 2006), however improvements in body dissatisfaction were not maintained at 12 month follow up.

Whereas the significant improvements in body dissatisfaction compared to assessment only control were maintained at 3 years follow up, in another study although did they did deteriorate (Stice, Marti, Spoor, Presnell, & Shaw, 2008). Also the effect sizes were only small and were less when compared to an expressive writing control. Similar results have also been found for an online dissonance-based intervention which significantly reduced body dissatisfaction compared to control (Stice et al, 2012). Cognitive dissonance techniques have been criticised for only including a small number of participants with high levels of body dissatisfaction, therefore it is not clear whether such interventions are useful for improving high levels of body dissatisfaction. Similar to other body image interventions, improvements in cognitive dissonance have been found to deteriorate over long term follow and such interventions fail to result in improvements for all participants. Equally cognitive dissonance interventions have tended to focus on adolescents and young people; therefore it is not clear how useful the programs would be for adults.

Given that body dissatisfaction has been found to be relatively stable in adults aged 20 to 60, who have not developed a clinical eating disorder (Heatherton, Mahamedi, Striepe, Field, & Keel, 1997), there are a large number of adults that continue to experience body dissatisfaction distress without the presence of an eating disorder. Adults are likely to have experienced negative feelings about

their appearance since adolescence and therefore have felt this way for some time, without developing an eating disorder. Therefore eating disorder prevention interventions such as cognitive dissonance techniques might be unsuitable for targeting persistent body image dissatisfaction.

Acceptance-based interventions endorsed by third-wave cognitive behavioural approaches (Hayes, Strosahl & Wilson, 2004) may offer an alternative method to the issue of appearance dissatisfaction. Rather than attempting to change the content of thoughts, that is central to CBT and cognitive dissonance approaches, it might be more useful for people with persistent body dissatisfaction to change the way they interact with their thoughts and feelings (Wade, George & Atkinson, 2009). Acceptance is described as the ability to experience unpleasant thoughts or feelings without evaluating them, making judgements or trying to change, control or avoid them (Baer, 2003). Acceptance of distressing thoughts might be particularly useful for adults with body dissatisfaction, because many of their upsetting thoughts might be correct and therefore hard to change. For example thoughts about one's body being imperfect are likely to be true and therefore it might not be appropriate to challenge and restructure these thoughts (Juarascio, Forman & Herbert, 2010). Rather it might be more useful to accept one's own imperfections which can increase a person's ability to cope with negative cognitions and experiences. Intervention techniques include cognitive defusion (techniques to increase cognitive flexibility e.g. the ability to defuse from difficult thoughts) and clarification of values and goals (for specific treatment targets). Participants are encouraged to accept difficult thoughts and feelings and engage in committed action to live a life that is based on their own values and goals.

There are a number of ways in which acceptance can impact emotional well being that are relevant to body image dissatisfaction. First, the ability to non-judgementally observe one's self can help develop a non-critical self-image (Kristeller, Baer, & Quillian-Wolever, 2006) which can be particularly useful for those who negatively evaluate their own bodies. Second, acceptance might be useful for improving body dissatisfaction by encouraging exposure to difficult thoughts and emotions which leads to a desensitisation to difficult appearance related thoughts and feelings and a reduction in distress. (Craske et al., 2008). Lastly, developing acceptance may increase levels of meta-cognitive awareness of one's own thought processes (Segal, Williams & Teasdale, 2002). Increasingly the likelihood of thoughts and feelings being simply observed, increasing a sense of control and which can reduce automatic responses (Stewart, 2004).

A recent literature review (Manlick, Cochran & Koon, 2012) provided preliminary findings of the benefits of acceptance and commitment therapy for improving body dissatisfaction and eating disorder symptoms for patients with eating disorders. Therefore it would be useful to identify whether acceptance-based approaches might benefit people with body dissatisfaction in those without a formal eating disorder.

The objective of this systematic review was to provide an exploratory examination of acceptance-based techniques for improving body image in adults without a formal eating disorder.

## **Method**

This review was reported using the Prisma checklist for reporting systematic reviews. (Moher, Liberati, Tetzlaff, Altman & The PRISMA Group, 2009) and guidance published by the Cochrane Collaboration (Higgins & Green, 2011). No protocol for this systematic review exists but further information can be provided by contacting the first author. No funding was received to conduct this systematic review.

## **Search strategy**

A literature search on acceptance-based approaches for improving body image dissatisfaction was conducted. Articles obtained were analysed using the systematic review technique.

The search terms were:

“Acceptance and Commitment Therap\*”

“Acceptance based\*”

“Acceptance Techniques”

“Acceptance”

“Cognitive Defusion”

“Body Image”

Body

Appear\*

Weight

Shape

Eating O

“Visible difference\*”

Disfigure\*

The search terms were checked with experts in the field of body image research to ensure they were comprehensive.

### **Sources for the collection of data**

The data were obtained by online consultation of the references from the following bibliographical databases: Amed, Cinahl plus, Medline/pubmed, Psycarticles, psycinfo, Social science citation index (via EBSCO) Psychology Information (PsycINFO), Psychology Articles (Psycarticles), Cochrane Library, the Institute for Scientific Information (ISI) Web of Science, Assia, British Humanities index, International bibliography of social sciences, Published international literature on post traumatic stress, Social services abstracts (via ASSIA). These databases were chosen either due to their relevance to psychological research or because they were employed in a previous systematic review which explored psychological interventions for people with a visible difference (Bessell & Moss, 2007). No starting time period was specified but records were searched up until the 5/8/12. As an additional search, the references lists in the selected articles were reviewed in order to identify studies not found by the primary search.

### **Study selection**

Papers were screened by the first author by reading the titles and abstracts and removed all irrelevant studies using the eligibility criteria below. The remaining papers were screened by the first author and a second reviewer (second author) by reading the full text of papers down to the final papers.

### **Eligibility criteria**

The eligibility criteria were identified using the PICO process. Studies with adult participants (over 18 years old), who had completed an acceptance-based intervention (either one specific acceptance technique or a manualised programme of techniques). The intervention could be one session or a number of sessions, provided by a clinician or researcher in a hospital, community or university setting. Studies had to include control group (receiving no intervention; either treatment as usual or waiting list control or no instruction) and those including a body image/ appearance outcome measure (either post-intervention or longer follow up) were included. Studies had to be in the English language and could be published or unpublished. Since journals are at risk of only publishing significant findings (Song, et al, 2010), unpublished/ grey papers were included to help reduce the risk of publication bias in the overall findings.

### **Data collection process and data items**

Two reviewers independently extracted data and included study design; participants (number and characteristics); intervention type, mode, setting, duration, and provider; outcomes measures; and main findings. Unpublished or missing information was requested from the study's corresponding author when necessary. Any discrepancies in extracted data was discussed between reviewers and resolved through consensus through both authors' double checking papers.

### **Risk of bias**

The methodological quality of each study was assessed according to the recommendations of the Cochrane Collaboration using the Cochrane risk of bias tool (2011) which examined the generation of allocation sequence; allocation concealment; blinding of outcome assessors; completeness of follow-up data, selective reporting and other sources of bias. Two reviewers independently rated the risk of bias for each of the aforementioned categories for each study. Data extraction results

were compared and differences were resolved by both authors referring back to the original papers to reach a consensus.

### **Summary measures**

The principle summary measures were the difference in means between the intervention and control groups pre and post intervention scores. Effect sizes and p-values were reported.

### **Synthesis of results**

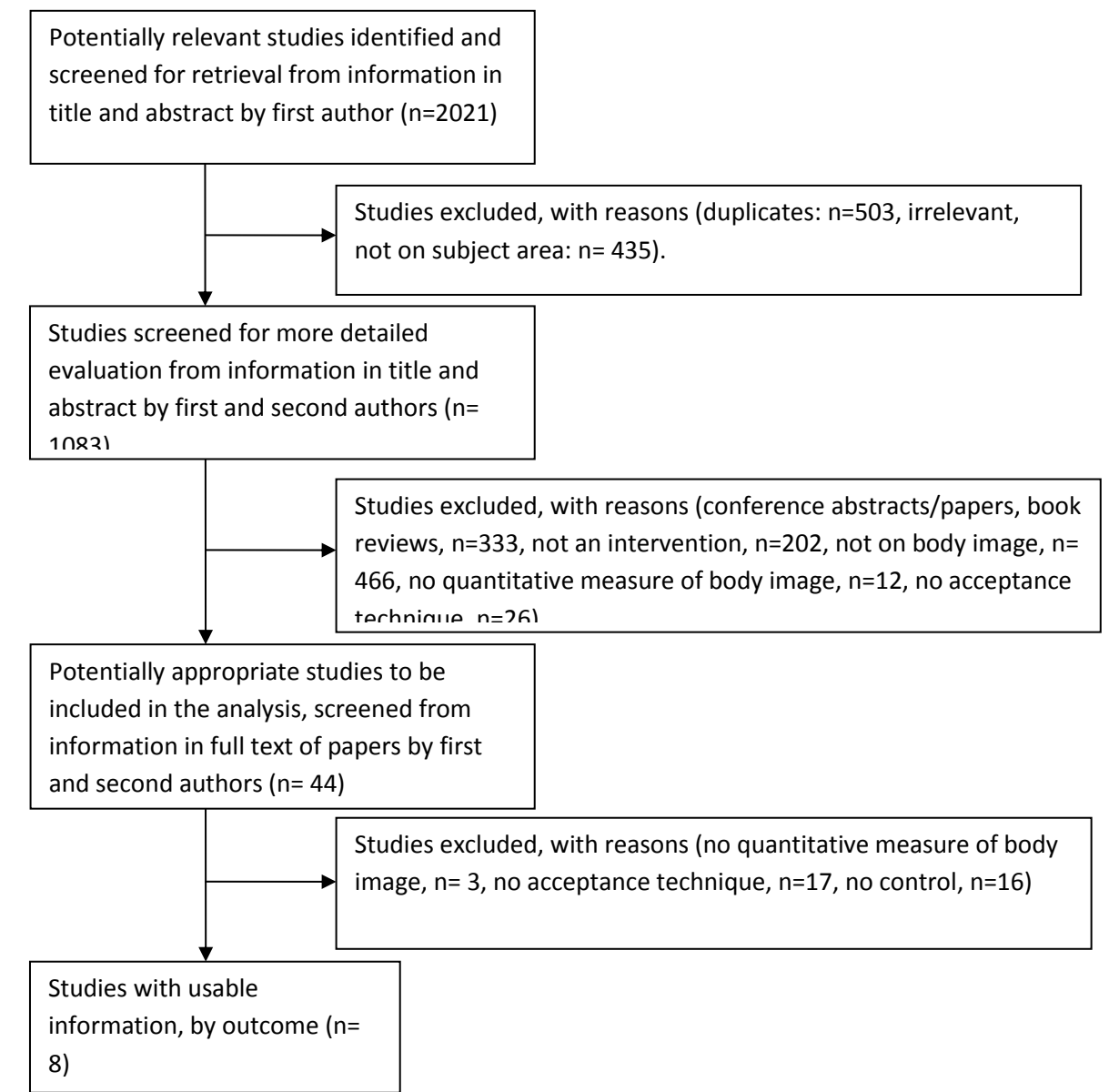
There was a lack of studies, varying methodological designs from one hour individual acceptance-based techniques to multiple session programmes of Acceptance and Commitment Therapy, and a variety of measures measuring different constructs of body image e.g. weight concerns or shape concerns or body image distress or body image. Since this amount of heterogeneity is not suited to a meta-analysis; the papers were analysed using a narrative synthesis.

## Results

### Study selection

Figure 1

*Flow diagram of systematic selection of papers in review*



The search identified 2021 studies, of which 503 were duplicates and 435 were irrelevant (not on subject area) and were excluded. Of the 1083 remaining, 333 were conference abstracts/papers/book reviews, 202 were not intervention papers, 466 were not on body image, 12 included no quantitative measure of body image and 26 did not use an acceptance technique, thus were excluded.

Of the 44 papers that remained, 3 papers did not use a quantitative measure of body image, 17 did not use an acceptance technique and 16 did not include a control, therefore they were excluded. The 8 remaining potentially appropriate studies were examined for inclusion/exclusion criteria and methodological quality (risk of bias).

### **Study characteristics**

The final 8 papers described 6 individual studies; the remaining 2 papers provided follow up data for two of the 6 studies.

The 6 individual studies in the review incorporated 493 individual participants (481 females and 12 males) and were published between 2008 and 2012 (table 1). All studies were published in peer reviewed journals apart from Clarke's (2008) study which was a doctorate thesis. The ethnicity of the participants was reported in four out of six studies (Atkinson & Wade, 2012, Clark, 2008, Lillis, Hayes, Bunting, & Masuda, 2009, Wade, George & Atkinson, 2009) and the majority ethnic group was Caucasian. The average BMI of participants across the studies was 26.58 (range 22.38 – 33.04), which falls in the overweight category. Most studies were conducted in America (Clarke, 2008, Pearson, Follette & Hayes, 2012, Wade et al, 2009), two studies were conducted in Australia (Atkinson et al, 2012, Wade et al, 2009) and one in Sweden (Weineland, Arvidsson, Kakoulidis & Dahl, 2012). Three studies recruited people with some level of body image dissatisfaction, while the rest enrolled people from the general/university population (Lillis et al, 2009, Pearson et al, 2012, Weineland, et al 2012).



### **Types of interventions**

Three studies used an acceptance and commitment therapy programme based on the original manual by Hayes et al (Lillis et al, 2009; Pearson et al, 2012, Weineland et al, 2012), while the others used one brief acceptance-based technique in their intervention (Atkinson et al, 2012, Clark, 2008, Wade et al, 2009). The interventions were provided by ACT trained therapists in three studies (Pearson, et al, 2012, Lillis, et al, 2009, Weineland, et al 2012) and partly online (Weineland, et al 2012) or were via a video (Atkinson et al, 2012), or tape recorder (Clark, et al, 2008) or a researcher read out loud intervention instructions from a card (Wade, et al 2009).

There were a range of control conditions, two studies used a waiting list control (Lillis at al, 2009; Pearson et al, 2012) and one used a treatment as usual control (Weineland et al, 2012). Two studies had a no instruction control (Atkinson et al, 2012, Clark, 2008) and one had a ruminative attention control and a no instruction control (Wade, et al, 2009).

### **Definition and outcome measures of body image satisfaction/dissatisfaction**

In all studies, body image satisfaction/dissatisfaction was defined as a score on a self-reported measure. Studies used a variety of different measures to identify body image satisfaction. Atkinson et al (2012) used the Body Dissatisfaction subscale of the Eating Disorders Inventory (Garner et al., 1983), plus two un-validated weight and shape satisfaction visual analogue scales. Clark (2008) used Body Shape Questionnaire (BSQ; Cooper et al., 1987), Body Image States Scale (BISS; Cash, 2004; Cash, Fleming, Alindogan, Steadman, & Whitehead, 2002) and visual analogue scales were created to assess weight and shape concerns throughout the study session. Lillis et al (2009) used the Weight Stigma Questionnaire which was designed for this study. Pearson et al (2012) used the Physical Appearance State and Trait Anxiety Inventory–State Version (PASTAS; Reed, Thompson, Brannick, & Sacco, 1991) and the Preoccupation with Eating, Weight, and Shape Scale (PEWS; Neimeier, Craighead, Pung, & Elder, 2002). Wade et al (2009) used the body dissatisfaction scale from the Eating Disorder Inventory (Garner, Olmstead & Polivy, 1983) and 3 visual analogue scales for weight satisfaction, appearance satisfaction and distress about feelings about body. Weineland et al (2012) used the weight and shape concerns subscales from the Eating Disorders Examination Questionnaire (EDEQ) and the Body Shape Questionnaire short version (BSQ).

The timing of the outcome assessments varied between studies. Some were taken directly post intervention (Atkinson, et al, 2012, Clark, 2008, Wade et al, 2009), others at two week follow up (Pearson et al, 2012) or at 3 month follow up (Lillis, et al, 2009) and another at 6 month follow up (Weineland et al, 2012).

Table 1

*Data extraction of included studies*

<b>Author</b>	<b>Participants</b>	<b>Type of acceptance technique</b>	<b>Control</b>	<b>Primary outcome measures</b>	<b>Main findings</b>
Atkinson & Wade (2012)	<p>T: n= 80 I: n = 55 C: n = 25</p> <p><i>Population type:</i> Psychology university students</p> <p><i>Gender:</i> female</p> <p><i>Age:</i> 18 -57 years old, (M = 23.59, SD =</p>	<p><i>Setting:</i> university</p> <p><i>Number of sessions:</i> 1 laboratory session (duration not reported)</p> <p><i>Facilitator:</i> Technique shown on video</p> <p>All participants received a body dissatisfaction (BD) induction exercise (which asked them to look at models with the 'ideal' body and make comparisons between the models bodies and their own). The intervention group then received a 10 minute acceptance training</p>	Control group received BD induction and then no further intervention.	<p><i>Body satisfaction:</i> Two visual analogue scale questions asking about weight satisfaction and appearance satisfaction: "How satisfied do you feel about your weight right now?" and "How satisfied do you feel about your appearance right now?" (Heinberg &amp; Thompson, 1995; Tiggemann &amp; McGill, 2004). Questions were not validated but correlate well with the Body Dissatisfaction subscale of the Eating Disorders Inventory (Garner et al., 1983) (which was validated with adults).</p>	<p>The engagement group showed significant improvements in weight satisfaction (<math>p &lt; 0.5</math>, <math>d = 0.22</math> (small positive effect size), and appearance satisfaction (<math>p &lt; 0.1</math>, <math>d = 0.38</math> (small positive effect size) compared to control.</p> <p>The non-engagement group showed significant improvements in weight satisfaction compared to control (<math>p &lt; 0.5</math>, <math>d = 0.24</math> (small effect size), but no significant differences were identified for appearance satisfaction.</p> <p>There were no significant differences in outcome</p>

	<p>8.98).</p> <p><i>Ethnicity:</i> predominantly Caucasian (number not reported)</p> <p>BMI: M = 24.12, SD = 3.57.</p> <p><i>Incentive:</i> participation earned course credit.</p>	<p>video that encouraged participants to accept the thoughts and feelings they were experiencing, to notice them and let them go. The training was about thoughts and feelings in general and was not specific to body image/appearance.</p> <p>Participants were then given a cue card to remind them of the training and asked to practice it for five minutes.</p>		<p><i>Measure of engagement in acceptance technique:</i></p> <p>participants were asked to write on a piece of paper the extent to which they understood acceptance concepts and applied this training in the exercise. Participants who reported to engage with acceptance training were described as the engagement group and those that did not, the non-engagement group.</p> <p><i>Timing of administration:</i></p> <p>All measures completed within the session: at baseline, after the body dissatisfaction induction, and following the practice period.</p>	<p>measures of those who engaged and those who did not engage in acceptance technique.</p> <p>Both the engagement and non-engagement groups produced significantly more people judged to be very improved in weight satisfaction compared to control (11%, <math>\chi^2</math> LR = 4.28 and 16%, <math>\chi^2</math> LR = 5.19, <math>p &lt; 0.5</math> respectively). Only the engagement group produced significantly more people judge to be very improved in appearance satisfaction compared to control (19%, <math>\chi^2</math> LR = 7.76, <math>p = .005</math>). However the number of people that improved was still relatively low.</p> <p><i>Attrition:</i> 1 participant excluded because of missing data (out of 80). (1.25%)</p>
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Clark (2008)	<p>T: n= 78 I: n= 39 C: n = 39</p> <p><i>Population type:</i> university students</p> <p><i>Gender:</i> female</p> <p><i>Age:</i> No range reported. (M=20.70 + 3.82 years).</p> <p><i>Ethnicity:</i> 53 caucasian, 30 asian, 11 black, 11 hispanic, 4 identified as more than one race and 8 other.</p> <p>BMI mean 22.38 which falls within the</p>	<p><i>Setting:</i> university laboratory on a computer.</p> <p><i>Number of sessions:</i> 1 laboratory session (duration not reported)</p> <p><i>Facilitator:</i> researcher facilitated session but acceptance exercise played on a tape recorder.</p> <p>An acceptance exercise played on a tape recorder (time duration not specified) taught participants to accept negative body image-related thoughts.</p> <p>Participants then viewed a slideshow of pictures illustrating the socio-cultural ideal body type and were encouraged to use the acceptance technique to respond to the thoughts they had while viewing the pictures.</p>	<p>Control group received no instructions but viewed slideshow of pictures.</p>	<p>Body Shape Questionnaire (BSQ) (Cooper et al., 1987).</p> <p>Body Image States Scale (BISS) (Cash, 2004; Cash, Fleming, Alindogan, Steadman, &amp; Whitehead, 2002).</p> <p>Visual Analog Scales-Body Image (VAS-BI). Visual analogue scales were created to assess short-term changes in body image (concerns about weight and shape) throughout the study session.</p> <p><i>Manipulation measure:</i> ascertained the extent to which participants tried and were able to accept their thoughts after their assigned technique.</p> <p><i>Timing of administration:</i></p> <p>Measures were taken pre and post intervention (within the session). Pre and post intervention (within the session).</p>	<p>Training in acceptance led to significant improvements in body image on both body image measures (BISS, <math>p &lt; 0.01</math>, <math>d = 0.87</math>, large effect size), (VAS-BI, <math>p &lt; .01</math>, <math>d = 0.56</math>, medium effect size) in comparison to the control group among women with high body dissatisfaction.</p> <p><i>Cohen's effect sizes were not included in the original thesis so the first author calculated these from the raw data included in the paper.</i></p> <p>No significant differences were found in participants with low body dissatisfaction in the acceptance condition.</p>
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	normal range of BMI (18.5 – 24.9)				<i>Attrition:</i> 2 excluded (technical issue and other feel asleep).
Lillis et al (2009)	<p>T: 84 I: 44 C: 40</p> <p><i>Population type:</i> Completed at least 6 months of a weight loss program in the past 2 years.</p> <p><i>Gender:</i> 76 females and 8 males.</p> <p><i>Age:</i> 39 – 64.4, M = 50.75, (no SD reported).</p>	<p><i>Setting:</i> university laboratory</p> <p><i>Number of sessions:</i> 1 day (6 hour) group ACT workshop.</p> <p><i>Facilitator:</i> led by an experienced ACT facilitator and a trainee clinical psychologist trained in ACT.</p> <p>Workshop aim was to improve the quality of life of obese people and used obesity stigma as the focus, increasing acceptance, mindfulness and values based action. Participants also took home a general ACT workbook. Neither the workshop nor the workbook contained strategies for losing weight.</p>	Waiting list control (completed workshop after 3 month follow up)	<p>Weight Stigma Questionnaire (WSQ) (not validated) WSQ was designed for this study as no relevant measure of weight-related stigma existed.</p> <p><i>Timing of administration:</i></p> <p>Assessments pre-interventions and 3 months post intervention.</p>	At 3 months the ACT condition showed significantly lower levels of perceived weight-related stigma as measured by the WSQ ( $F(1, 83)=24.34, p<.001$ , partial $\eta^2=.23$ , Cohen's $d = 1.07$ —a large effect) compared to control.

	<p><i>Ethnicity:</i> 78 Caucasian, 4 Hispanic, 2 African American.</p> <p>BMI: M= 33.04</p>				
Pearson et al (2012)	<p>T: 73 I: 39 C: 34</p> <p><i>Population type:</i> women responded to advert as having body dissatisfaction</p> <p><i>Gender:</i> all female</p> <p><i>Age:</i> 18 - 68, M = 43.4, SD= 14.7.</p>	<p><i>Setting:</i> university</p> <p>ACT 1 day - 8 hour group workshop involving components of ACT, which include: creative hopelessness, control as the problem/willingness as the solution, mindfulness and acceptance, values clarification, barriers to values, and committed action.</p>	<p>Wait-list control condition (completed ACT workshop two weeks after intervention group).</p>	<p>The Preoccupation with Eating, Weight, and Shape Scale (PEWS; Neimeier, Craighead, Pung, &amp; Elder, 2002).</p> <p>The Physical Appearance State and Trait Anxiety Scale (PASTAS-S) (Reed et al., 1991).</p> <p><i>Timing of administration:</i></p> <p>Measures taken pre intervention, post intervention, 1 week post intervention and 2 weeks post intervention.</p>	<p>ACT workshop significantly improved body anxiety (PASTAS-S) (<math>F(1, 56.73) = 22.78, p = .00, d = 1.27</math>, ( large effect) and reduced distress about thoughts regarding eating, weight, and shape (PEWS) (<math>F(1, 59.12) = 6.01, p = .02</math> (<math>d = .64</math>, medium effect).</p> <p><i>Attrition:</i> 3 out of 73 did not attend workshop. 12 out of 34 waiting list control didn't complete 1st follow up (35%) and 10 out of 39 ACT didn't complete 1st follow up (26%). 9 out of 34 waiting list control didn't complete 2nd follow up</p>

	<p><i>BMI</i>: M= 29.3, SD = 6.0.</p> <p><i>Ethnicity</i>: not reported.</p>				<p>(26% attrition) and 13 out of 39 of ACT didn't complete 2nd follow up (33% attrition). Overall attrition was 30% at 1st follow up and 30% at second. Overall 30% attrition.</p>
<p>Wade, George &amp; Atkinson (2009)</p>	<p>T: n= 40</p> <p>A: n= 20</p> <p>C: n= 20</p> <p><i>Population type</i>: university students</p>	<p><i>Setting</i>: university</p> <p><i>Number of sessions</i>: 1 laboratory session (duration not reported)</p> <p><i>Facilitator</i>: researcher read instructions for acceptance technique from card.</p>	<p>2 conditions:</p> <p>A: acceptance</p> <p>C: control (no instructions)</p>	<p>3 VAS scales based on Heinberg &amp; Thompson (1995), asked three questions about <i>weight satisfaction</i>, <i>appearance satisfaction</i> and <i>distress</i> about feelings about body.</p> <p><i>Timing of administration</i>:</p>	<p>Acceptance condition resulted in significant improvements in weight satisfaction compared to control (<math>f=16.58</math>, <math>p &lt; .001</math>, <math>d=0.56</math>, medium effect size) and in appearance satisfaction compared to control (<math>f= 10.67</math>, <math>p .002</math>, <math>d = 0.36</math>, small effect size).</p> <p>Only the acceptance condition resulted in significantly increased appearance satisfaction over time (small</p>



	<p><i>Gender:</i> all female</p> <p><i>Age:</i> 18 – 57, M = 24.38, SD = 9.39.</p> <p><i>BMI:</i> M = 23.46, SD = 4.82).</p> <p><i>Ethnicity:</i> all Caucasian.</p> <p>1st-year psychology undergraduate students</p>	<p>All participants completed a body dissatisfaction (BD) induction and then those in the acceptance condition were verbally informed of the instructions to their assigned condition by the researcher reading the instructions off an instruction card (participants also received a paper copy of the instruction). Participants were then asked to practice the technique for 5 minutes, completed the VAS scales once every minute.</p> <p>The acceptance technique involved general instructions encouraging participants to accept the thoughts and feelings that they were experiencing. Instructions were not body image related.</p>		<p>Measures completed post BD induction and 4 other occasions during the practice period.</p>	<p>effects sizes) compared to control (<math>f=10.67</math>, <math>p= .002</math>, <math>d= 0.36</math>, small effect size).</p> <p>Acceptance condition resulted in a significantly greater number of people being improved in weight satisfaction (20%, <math>\chi^2</math> LR = 5.99, <math>p = .01</math>) and appearance satisfaction (45%, <math>\chi^2</math> LR = 6.53, <math>p = .01</math>) compared to control.</p> <p><i>Attrition:</i> No missing data/attrition.</p>
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<p>Weineland et al (2012a); Weineland, Hayes &amp; Dahl (2012b) (6 follow up data)</p>	<p>T: 39 I: 19 C: 20</p> <p><i>Population type:</i> Participants 6 months post bariatric surgery who wanted to improve their quality of life</p> <p><i>Gender:</i> 35 females and 4 males.</p> <p><i>Age:</i> 25 - 59 years, M= 43.08 (no SD reported)</p>	<p>8 session Acceptance and commitment therapy programme for patients who had received bariatric surgery.</p> <p>Programme consisted of two face-to-face sessions, conducted at the local surgery centre, and six-weekly sessions via Internet, with a 30 min support session weekly over the telephone with trained ACT facilitator.</p> <p>The ACT intervention included the core concepts of ACT such as acceptance, committed action, values, defusion, and contact with the present moment. It focused on identifying values related to health behaviours including exercise and eating, and encouraging the acceptance of body image. It also focused on the individual participants' behavioural analysis of their experiential avoidance, which was typically expressed as emotional eating.</p>	<p><i>Treatment as usual:</i></p> <p>participants received follow up sessions with the bariatric surgery team.</p>	<p>Eating disorders examination questionnaire (EDEQ) (Fairburn &amp; Beglin, 1994). EDE-Q consists of four sub scales: restraint, eating concerns, weight concerns and shape concerns (validated with adults).</p> <p>Body shape questionnaire short version (BSQ) (Cooper, Taylor, Cooper &amp; Fairburn, 1987) (validated with adults).</p> <p><i>Timing of administration:</i></p> <p>Outcome measures completed pre and directly post intervention and 6 months follow up (Weineland, 2012b).</p>	<p>ACT showed significant large improvements in body dissatisfaction (BSQ), from pre to post (es = 1.14) and from pre to follow-up (estimate = -9.95, SE = 3.05, t [59.11] = -3.26, P = 0.002, es = 0.91, large effect size), while those in the TAU condition did not. The difference between conditions on pre to post changes was significant and large while differences in pre to follow-up changes was significant and medium (t [58.65] = 2.09, P = 0.041, es = 0.77). ACT significantly reduced shape concerns compared to control, with pre to post changes being significant and large while the difference between pre to follow-up changes was marginally significant and medium (t (59.01) = 1.84, P = 0.071, es = 0.68). <i>Attrition:</i> 6 out of 39 dropped out (15.3 %). 12/15 participants in ACT group</p>
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	BMI: M = 27.19 (range 20.76– 38.01)  <i>Ethnicity:</i> not reported.				were followed up at 6 months (20% attrition). 17 of 18 in TAU were followed up at 6 mths (5.5% attrition).
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## **Methodological quality**

Table 2 presents the risk of bias of all 6 individual studies.

### *Selection bias*

All studies but one described an appropriate method of *randomisation* (Cochrane Collaboration, 2011). Randomisation was conducted by computer based randomisation (Atkinson, et al, 2012, Wade, et al, 2009, Weineland, et al, 2012), by coin flip (Pearson, et al, 2012) and using a random numbers table (Lillis, et al, 2009). However Clarke's (2008) study did not describe the method of randomisation, which resulted in an unclear risk of selection bias, increasing the likelihood of the effect sizes in this study being exaggerated.

*Methods of allocation concealment* were not reported in any study and email communication with all authors identified that this was probably not done. Despite the majority of studies describing an adequate method of randomisation, there was still a high risk of selection bias, due to the lack of allocation concealment in all studies. Overall this suggests that the effect sizes in all studies are likely to have been magnified.

### *Performance and detection bias*

None of the studies were able to blind participants to their condition. Only one study blinded the personnel administering the intervention (Clark, 2008). Since in all studies outcome measures were patient reported, outcome assessors were not blind to the condition they were in. Overall every study presented a high risk of performance and detection bias, increasing the likelihood of the effect sizes being exaggerated. However since in psychological interventions it is often not possible to blind participants or the personnel administering the intervention, this risk of bias is not possible to overcome.

### *Attrition bias*

Of the three studies which conducted follow up assessments in addition to post intervention measures, attrition rates were 7.5% at 3 months (Lillis, et al, 2009), 30% at 2 weeks (Pearson et al, 2012) and 12% at 6 month follow up (Weineland, et al, 2012). There were no significant differences

in attrition rates between the intervention group and control in any of the studies. Overall the studies show a low risk of attrition bias.

#### *Selective reporting*

Three studies conducted power analyses (Atkinson, et al, 2012, Lillis, et al, 2009, Wade, et al, 2009, Weineland, et al, 2012), two studies did not (Pearson, et al, 2012, Clark, 2008). Two studies used an intention to treat approach to analyse the data (Weineland, et al, 2012, Wade, et al, 2009). Pearson et al (2012) appeared to use an intention to treat approach, although did not describe it as this. The remaining studies appeared to use a per protocol approach, although it was not explicitly described as this in any of the studies (Lillis, et al, 2009, Atkinson, et al, 2012, Clark, 2008). All studies reported the results of all measures that were described in their methods. Overall all studies described clearly how the data was analysed and the number participants that included in the analysis. Therefore there was a low risk of selective reporting bias.

#### *Other sources of bias*

All studies included a control and there were no significant differences on any of the body image satisfaction outcome measures between the acceptance group and control at baseline for any of the studies. Therefore there was a low risk of other sources of bias. However as previously discussed the types of control conditions varied considerably.

Table 2

A table outlining the risk of bias of individual studies using the Cochrane risk of bias tool

	Random sequence generation (selection bias)	Allocation concealment (selection bias)	Blinding of participants and personnel (performance bias)	Blinding of outcome assessment (detection bias) (patient-reported)	Incomplete outcome data (attrition bias)	Selective reporting (reporting bias)	Other sources of bias – significant differences between intervention and control groups in baseline measures
<b>1. Atkinson et al (2012)</b>							
<b>2. Clarke (2008)</b>							
<b>3. Lillis et al (2009, 2011)</b>							
<b>4. Pearson et al (2012)</b>							
<b>5. Wade et al (2009)</b>							
<b>6. Weineland et al (2012a; 2012b)</b>							

## General findings

There is a lack of research investigating acceptance-based techniques for improving body image/appearance satisfaction/dissatisfaction. Of the 6 studies that were included in the review, analyses of changes in post treatment outcome measures of body image/ appearance satisfaction compared to control showed that all studies showed a significant effect of acceptance-based approaches which reported effect sizes (Cohen's  $d$ ) ranging from small to large ( $d = 0.22 - 1.27$ ). Effect sizes of  $d = 0.2$  are deemed small,  $d = 0.5$  medium and  $d = 0.8$  large (Cohen, 1977). However studies generally presented methodological issues (small sample sizes, lack of allocation concealment, a variety of comparison groups, reliance on self report, and heterogeneity of participants – mainly Caucasian women) that prevent conclusions being drawn to a wider population of people, including men.

There were two different intervention types within the six reviewed articles. These were: a multiple session programme of Acceptance and Commitment Therapy based on the Hayes manual used with clinical and non-clinical samples and an individual acceptance- based technique used with a non-clinical student sample. The individual studies are briefly described in relation to their intervention type and critiqued below:

### *A brief single acceptance-based technique with a non-clinical student sample*

Atkinson and Wade (2012), Clark (2008) and Wade, et al's (2009) studies involved one university based experimental session which used an individual acceptance-based technique. All studies included a control condition and participants were randomly assigned to conditions. In Atkinson and Wade (2012) and Wade et al's (2008) studies participants also completed a body dissatisfaction induction exercise before the acceptance intervention, which aimed to heighten the intervention effects. Participants were asked to look at pictures of models with the 'ideal' body and make comparisons between the models bodies and their own.

Atkinson and Wade's (2012) study involved 80 female first-year psychology students (18 - 57 years old). All participants completed the body image dissatisfaction induction exercise. After the

induction, participants in the acceptance condition watched a 10 minute video teaching an acceptance-based technique. They were then asked to practice the acceptance technique for 5 minutes and were given a cue card with four statements on it which reminded them of how to use the technique. The control condition did not receive any instructions after the body dissatisfaction induction and were just monitored for 5 minutes.

The results showed that the acceptance training had a small significant effect at increasing weight and appearance satisfaction compared to the no instruction control. The results also showed that even participants in the acceptance condition who reported not properly engaging in the technique, showed significant improvements in weight satisfaction compared to control. Although the findings indicated that there were no significant differences in body image outcome measures between those that engaged and did not engage in the acceptance technique. Both the engagement and non-engagement groups produced significantly more people judged to be very improved in weight satisfaction compared to control. Only the engagement group produced significantly more people judge to be very improved in appearance satisfaction compared to control. However the number of people that improved was still relatively low.

Wade et al's (2009) involved 40 female undergraduates were randomly assigned to acceptance (n=20) or no instruction control. All participants completed a body dissatisfaction induction using the same protocol as Atkinson et al. The researcher then verbally informed participants of the instructions to the acceptance condition by reading the instructions off an instruction card (participants also received a paper copy of the instruction). Participants were then asked to practice the technique for 5 minutes. Every minute during the practice period, participants were prompted by a beep on the computer and were asked to answer 3 visual analogue scale questions which related to how they currently felt about their weight, appearance and body distress. Those in the control condition received no instruction and were just monitored.

The results showed that the acceptance condition was associated with small and medium effect size changes in weight satisfaction and appearance satisfaction compared to the control. When comparing post induction and final VAS scores, only the acceptance condition resulted in significantly increased appearance satisfaction over time (small effects sizes) compared to those people in the control. Acceptance condition also resulted in a significantly greater number of people



being improved in weight satisfaction (20%) and appearance satisfaction (45%) compared to control.

Clark's (2008) study involved 78 female undergraduate students. The acceptance technique was played on an audio tape and the control condition received no instructions from the audio tape. Participants then viewed a slideshow of pictures illustrating the socio-cultural ideal body type and were encouraged to use the acceptance technique to respond to the thoughts they had while viewing the pictures. Manipulation checks suggested that acceptance group found it difficult to employ their technique. Nevertheless, the results showed that whether participants passed the manipulation check or not, acceptance training had beneficial effects on body image in comparison to the control condition among participants with high body dissatisfaction. However the acceptance training did not result in significant differences in any of the outcome measures in those with low body image satisfaction.

#### *Synthesis of studies using a single acceptance-based technique with a non-clinical student sample*

Overall the evidence suggests that a single brief acceptance-based intervention can be effective at improving body image appearance satisfaction in a non clinical sample. However Atkinson and Wade (2012), Wade et al (2009) and Clark's (2008) studies have a number of methodological limitations. All studies had a small sample size in each condition. Atkinson and Wade (2009) and Clark's (2008) were underpowered for the statistical analysis that was performed, increasingly the likelihood of the results overestimating the small significant effect sizes. None of the studies collected follow up data, so it is difficult to identify the longer term effects of the acceptance technique. All studies recruited a non-clinical student sample which prevents generalisation of these findings to people with clinical levels of body image dissatisfaction. In all studies the control received no instructions, therefore it was not clear whether it was the acceptance technique itself that was improving body image satisfaction or whether it could have been a placebo effect of participants receiving an intervention of some kind.

Atkinson and Wade (2012) and Clark (2008) both included an internal validity measure which identified the extent to which participants were actually engaging in their designated training. This

indicated that some participants found it difficult to engage in the acceptance techniques. Wade et al (2009) did not include such a measure, therefore it was not clear how well participants engaged in the acceptance technique or whether they were using any other techniques in the practice period. Atkinson and Wade (2012) and Wade et al's (2009) studies included additional analyses of clinical change by analysing the numbers of participants judged to be improved in the intervention and control groups. Both resulted in significantly more people in the acceptance group improving compared to control, although this was relatively low in Atkinson and Wade's (2012) study.

Similarly in Atkinson and Wade (2012) and Wade et al's (2009) studies all participants including the control conditions received the body dissatisfaction induction, so their weight and appearance satisfaction scores were artificially reduced. It is not clear whether the acceptance technique would have induced significantly different results compared to a control who had not received the body image dissatisfaction induction. This makes it difficult to identify whether the acceptance technique would be useful for people who haven't received a body image dissatisfaction induction or those with heightened levels of body dissatisfaction.

*An acceptance and commitment therapy programme used with a clinical and a non clinical sample*

Three studies by Lillis et al (2009), Pearson et al (2012) and Weineland et al (2012) used an acceptance and commitment therapy (ACT) programme.

Lillis et al's (2009) study involved 84 participants (76 female and 8 males, mean age 51.7) who had completed least 6 months of any structured weight loss program in the previous 2 years. Participants were invited to take part if they wanted to learn skills to live a more fulfilling life consistent with their values. Participants were randomly assigned to a 1 day (6 hour) ACT workshop using obesity stigma as the focus, increasing acceptance, mindfulness and values based compared to waiting list control. At 3 months post intervention the ACT condition had a significant large effect on reducing weight-related stigma compared to control. The results also showed that the ACT group lost significantly more weight than the control. However further analysis indicated that this was not responsible for the significant reductions in weight related stigma of the ACT group.

Weineland et al's (2012) study included 39 participants (35 women and 4 men, aged 25 to 59) who had undergone bariatric surgery at least 6 months previously. Participants were randomly assigned

to 8 weekly sessions of ACT or to treatment as usual. Participants in the ACT condition were given two face-to-face sessions in a hospital surgery department and six internet sessions, with a 30 min weekly support session over the telephone. The results showed that at 6 months post intervention the ACT group had a significant medium effect at improving self perceived body dissatisfaction, a significant large effect on shape concerns and a significant medium effect on weight concerns compared to the treatment as usual control.

In Pearson et al's (2012) study 73 female participants (aged 18 to 68, mean age 43.4, 14.7 SD) who responded to an advert and self reported as having body dissatisfaction were randomly assigned to a 1 day (8 hour) ACT workshop or waiting list control plus self-monitoring. Results showed that two weeks post intervention, the ACT condition resulted in a significant large reduction in body anxiety and a significant medium reduction in distress about thoughts regarding eating, weight, and shape compared to the wait-listing control condition.

*Synthesis of studies using an acceptance and commitment therapy programme used with a clinical and a non-clinical sample*

Overall the three studies which employed an ACT programme resulted in medium and large significant improvements on body image related measures. However all studies had a small sample size and participants were relatively homogeneous in terms of gender (majority were female) and ethnicity (majority were Caucasian) and thus the sample is not representative of men or of other ethnic groups. Similarly the time when follow up assessments were administered varied from 2 weeks to 6 months. None of the studies included a formal measure of adherence was taken. Lillis created one of outcome measures (Weight Stigma Questionnaire) because no alternative measures were available and therefore this measure was not validated making it difficult compare the findings with other populations.

**Process variables results**

All three of studies which used an ACT programme, included process outcome measures to identify any variables which might be moderating intervention effects on body image/appearance (see Table 2).

All three studies found that improvements in weight specific acceptance processes (AAQ-W) significantly mediated the improvements in the body image/ appearance outcomes. In addition Lillis et al (2009) and Pearson et al (2012) found that improvements in general ACT processes (AAQ) also mediated improvements in body image/appearance ratings. Weineland et al (2012) did not include a measure of general ACT processes.

Table 2 *The results of process measures from studies which used an ACT programme*

Author	Intervention	Measure of process variable	Findings
Lillis et al (2009)	1 day (6 hour) group ACT workshop for people that had been in a weight loss programme in the previous 6 months.	<p>Acceptance and Action Questionnaire for Weight (AAQW). The AAQW has good psychometrics and construct validity. (AAQ-W; Lillis &amp; Hayes, 2008).</p> <p>Acceptance and Action Questionnaire (Bond &amp; Bunce, 2003) has good reliability and validity (Hayes et al, 2004).</p> <p><i>Timing of administration:</i> Measures taken pre intervention and 3 months post intervention.</p>	<p>ACT showed large significant increases in psychological flexibility, in general and weight specific acceptance, defusion, and valued action in the face of psychological barriers compared to control (AAQ-W, <math>p &lt; .05</math>), <math>d = 1.34</math>, AAQ, <math>p &lt; .05</math>, <math>d = .68</math>).</p> <p>Weight specific ACT processes (AAQ-W) (<math>p = .00</math>, CI: 4.55 – 15.01) and general ACT processes (AAQ) (<math>p &lt; .01</math>, CI: 0.82 – 7.69) significantly mediated reductions in perceived weight related-stigma.</p> <p>ACT resulted in greater weight loss (BMI) compared to control. However post analyses showed that improvements in weight related stigma was not due to weight loss in ACT group.</p>

<p>Pearson et al (2012)</p>	<p>ACT 1 day - 8 hour group workshop for women with body dissatisfaction</p>	<p>Acceptance and Action Questionnaire for Weight (AAQW) has good preliminary psychometrics and construct validity. (AAQ-W; Lillis &amp; Hayes, 2008).</p> <p>Acceptance and Action Questionnaire (Bond &amp; Bunce, 2003) has good reliability and validity (Hayes et al, 2004).</p> <p><i>Timing of administration:</i></p> <p>Measures taken pre intervention, post intervention, 1 week post intervention and 2 weeks post intervention.</p>	<p>The ACT condition showed in a significant medium increase in weight specific ACT processes (AAQ-W) compared to control [estimate= -5.28, SE=2.07, t (86.64)=-2.55, p=.01, d=.53, a medium effect].</p> <p>The ACT condition showed a small increase in general ACT process (AAQ), which was not significant but approaching significance [estimate=- 2.16, SE= 1.10, t(100.12) =-1.96, p = .05, d=.38, a small effect size].</p> <p>The overall effect of the ACT condition was significantly mediated by the changes in weight related (AAQ-W, a significant and large effect, F(1, 51.16)=21.05, p=.00 (d=1.28) and general ACT process (AAQ, a significant and medium effect, F(1, 60.21)= 6.91, p = .01 (d =.68) .</p>
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<p>Weineland et al (2012a); Weineland, Hayes &amp; Dahl (2012b) (6 month follow up data)</p>	<p>An 8 session Acceptance and commitment therapy programme for patients who had received bariatric surgery.</p>	<p>Acceptance and action questionnaire for weight (AAQ-W).</p> <p><i>Timing of administration:</i></p> <p>Measures completed pre and directly post intervention and 6 months follow up (Weineland, 2012b).</p>	<p>At post intervention, ACT significantly increased acceptance of previously avoided thoughts and feelings related to weight (AAQ-W, <math>F=8.59</math>, <math>p= 0.01</math>, <math>n_2p= 0.18</math>, large effect size), as compared to TAU control.</p> <p>At 6 month follow up, the ACT group had significant medium improvements in acceptance of previously avoided thoughts and feelings related to weight (<math>t [58.69] = 1.84</math>, <math>P = 0.07</math>, <math>d= 0.68</math>, medium effect size) compared to control.</p> <p>Reductions in body dissatisfaction were significantly mediated by weight related psychological flexibility (<math>P &lt; 0.05</math>) (point estimate = -8.16, SE = 4.00, 95% CI: -22.75, -2.67).</p>
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## Discussion

Overall the findings suggest that there is a lack of research investigating the effectiveness of acceptance-based techniques for improving body image dissatisfaction. The evidence that was available indicated that acceptance-based interventions were beneficial for improving body image satisfaction/dissatisfaction in adult participants without a clinical eating disorder, with all studies showing improvements on indicators of body image. However the studies generally presented methodological issues (small sample sizes, lack of allocation concealment, a variety of comparison groups, lack of long term follow up and reliance on self-report) that reduced the internal and external validity of the findings.

The three studies that employed an ACT programme and involved patients with high levels of body dissatisfaction showed significant medium and large effect sizes in improving body image satisfaction. The results suggest that an ACT programme can substantially improve body image satisfaction in those that have high levels of body dissatisfaction. The effect sizes were generally larger than those found in the studies which used a single acceptance-based technique and this is likely to reflect the more substantial training participants received in the ACT programmes. Interestingly the majority of ACT sessions were provided online in Weineland et al's (2012) study. This suggests that the benefits of ACT for improving body image dissatisfaction may not be restricted to face to face interventions. Future research could identify whether an ACT programme that is delivered entirely online also results in significant improvements in body image dissatisfaction.

Significant improvements in body image satisfaction/ dissatisfaction were also found in the interventions which only used a single acceptance-based technique in a non-clinical sample. These three studies with non-clinical samples showed significant small and medium improvements on body image measures compared to control. This suggests that even a brief acceptance-based technique has the potential to improve body image satisfaction. However the results should be interpreted with caution, since two of these studies used a body dissatisfaction induction to magnify participants' levels of body dissatisfaction and the other found that the acceptance



technique was only beneficial for participants with high levels of body dissatisfaction. This suggests that a single acceptance technique might be more useful as a treatment for those with high levels of body dissatisfaction rather than a preventative intervention such as the cognitive dissonance interventions employed to prevent eating disorders (Stice et al, 2012). Another possible explanation could be that the measures of body satisfaction/dissatisfaction (one question VAS scales) were not sensitive enough to identify lower levels of body dissatisfaction and in turn any potential benefits of the intervention. Future studies could explore whether a single acceptance-based technique or an ACT programme is useful for improving body image dissatisfaction in a non-clinical sample when a body dissatisfaction induction is not included in the design and when more sensitive measures of body dissatisfaction are utilised.

Overall the results indicated that acceptance-based techniques can be beneficial for people with body dissatisfaction even though they did not have a clinical eating disorder. However the preliminary findings suggest that such techniques might be more useful for those with high levels of body dissatisfaction. However the studies presented with a number of methodological issues which make it difficult to make conclusions about the effectiveness of acceptance-based techniques. Due to the variety of treatment and comparison groups employed in the studies in this review it is difficult to identify the specific effects of the intervention. Similarly as no adequate attention control was included in any of the studies; it is not clear whether the benefits of the acceptance interventions were due to the acceptance techniques specifically or to the attention that participants were given during the intervention conditions. Future research should include an attention control condition to identify whether it is the acceptance skills that are improving body dissatisfaction or whether it is that participants are receiving any kind of intervention.

In all studies when participants were randomised to their conditions, there was a lack of allocation concealment of personnel from knowing the upcoming assignments, which resulted in an overall high risk of *selection bias*. Studies which have investigated the extent to which lack of allocation sequence concealment impacts the magnitude of effect estimates indicate that studies that lacked adequate allocation sequence concealment on average were 18% more 'effective', than those with satisfactory allocation concealment (Pildal, et al, 2007). This suggests that the benefits of acceptance-based techniques in this review are likely to have been magnified. In order to reduce the risk of selection bias, future studies should employ and report adequate allocation sequence concealment.

The majority of participants in the included studies were white women; this prevents conclusions being drawn to a wider population of people such as men and ethnic minority groups. Future studies should aim to recruit participants from these populations to identify whether acceptance-based techniques are beneficial to these samples.

Three of the studies used a manipulation check which identified the extent to which participants felt they had successfully engaged in the acceptance technique. Overall these indicated that a significant number of participants found it difficult to employ the acceptance techniques. This suggests that participants/ patients might need additional time/support when being taught acceptance-based interventions for the training to be the most beneficial. Similarly, only two studies in this review included analyses of the number of people judged to be improved in the intervention group compared to control. In order for future acceptance-based interventions to provide stronger evidence of clinical change, these analyses should be conducted and reported.

Nonetheless, of the 3 studies which included process variables, all showed that improvements in weight related ACT processes in the intervention groups mediated improvements in body image satisfaction/ dissatisfaction. Of the 2 studies which included measures of general ACT process, both showed that improvements in general ACT processes also mediated improvements in body image measures. This provides further support for the role that acceptance processes might play in improving body image/appearance satisfaction. It also highlights the importance of including acceptance process outcome measures in such interventions to learn more about the processes between body image satisfaction and acceptance.

In summary, since all studies reported satisfactory results in this review, it would suggest that acceptance-based interventions appear a promising method of intervention. However, more thorough evaluation with stronger methodology is needed to clarify its effectiveness and applicability.

## Future directions

There is a need for more randomised controlled trials to investigate acceptance-based interventions with larger sample sizes to be able to identify more clearly the benefit of such techniques. Since all the studies in this review involved adult participants, it would be useful to find out whether acceptance-based interventions could be used as a preventative or treatment intervention for improving body image satisfaction in children or teenagers. Further studies could also investigate the use of acceptance-techniques for improving body image/appearance satisfaction with those that have a condition or injury that affects appearance or with men or people from ethnic minority groups. Similarly in line with the increasing prevalence of online behaviour change interventions in healthcare services and with the preliminary findings from one of the studies in this review future studies could further investigate the effectiveness of online acceptance-based interventions.

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## Appendix B: Evidence of Ethical Approval for study



Faculty of Health & Applied  
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Bristol BS16 1DD

Tel: 0117 328 1170

UWE REC REF No: HAS/14/05/85

Date: 5<sup>th</sup> June 2014

Catrin Griffiths  
Centre for Appearance Research (CAR)  
Department of Social Sciences  
University of the West of England  
Frenchay Campus  
Coldharbour Lane  
Bristol, UK.  
BS16 1QY

Dear Catrin

**Application title: investigating the role of psychological flexibility on disordered eating behaviours within the tripartite influence model for women**

Your ethics application was considered by the Faculty Research Ethics Committee and, based on the information provided, has been given ethical approval to proceed. This is a well-designed study, with key issues considered.

You must notify the committee in advance if you wish to make any significant amendments to the original application using the amendment form at

<http://www1.uwe.ac.uk/hls/research/researchethicsandgovernance.aspx>

Please note that any information sheets and consent forms should have the UWE logo. Further guidance is available on the web: <http://www1.uwe.ac.uk/aboutus/departmentsandservices/professionalservices/marketingandcommunications/resources.aspx>



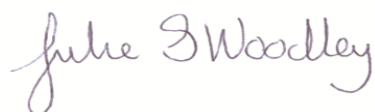
The following standards conditions also apply to all research given ethical approval by a UWE Research Ethics Committee:

1. You must notify the relevant UWE Research Ethics Committee in advance if you wish to make significant amendments to the original application: these include any changes to the study protocol which have an ethical dimension. Please note that any changes approved by an external research ethics committee must also be communicated to the relevant UWE committee.
2. You must notify the University Research Ethics Committee if you terminate your research before completion;
3. You must notify the University Research Ethics Committee if there are any serious events or developments in the research that have an ethical dimension.

Please note: The UREC is required to monitor and audit the ethical conduct of research involving human participants, data and tissue conducted by academic staff, students and researchers. Your project may be selected for audit from the research projects submitted to and approved by the UREC and its committees.

We wish you well with your research.

Yours sincerely

A handwritten signature in purple ink that reads "Julie Woodley". The signature is written in a cursive, flowing style.

Dr Julie Woodley  
Chair  
Faculty Research Ethics Committee

c.c *Tim Moss*

## **Appendix C: Example of Information Sheet for study**

### **Information Sheet**

#### **Study title: Exploring body attitudes and health behaviours**

You are being invited to take part in this study. Before you decide if you would like to participate, it is important for you to understand why the research is being done and what it will involve.

Please take your time to read the following information carefully and discuss it with others if you wish. Email me (catrin.griffiths@uwe.ac.uk), if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

#### **Who is carrying out the research?**

This project is being carried out by Catrin Griffiths, a Trainee Health Psychologist based at the University of the West of England.

#### **What is the purpose of the study?**

The purpose of this study is to investigate the types different types of health behaviours that people choose to engage in.

#### **What will participation involve and how long will it take?**

If you agree to take part in the study you will be required to fill in an online survey. The survey will take approximately 20 minutes of your time. It is really important that you complete the survey in one sitting so please ensure that you have enough time to complete this survey now.

You will also be asked some questions about yourself (e.g., demographic questions) and the different types of health behaviours that you engage in.

#### **What about confidentiality?**

The information you give us will be treated with the highest level of confidentiality. As the survey is completed online, you will be asked to create a unique participant identification code. However, your name and identity will never be connected to your responses. Information that would make it possible to identify you or any other participant will never be included in any sort of report.

Your responses will be written up and the data may be published in an academic journal or elsewhere and although direct quotes from you may be used in a paper or report, your name and identifying information will be kept anonymous. The data will only be accessible to those working on the project.

**Do I have to complete the whole survey?**

Your participation in this research is entirely voluntary. You have the right to answer as many or as few questions asked as you wish. You also have the right to withdraw from the study up to four weeks after you have completed the survey. Should you wish to withdraw you will need to inform us by email, quoting your participation identification code which you will generate before beginning the study. This will enable us to identify all the material that needs to be deleted due to your withdrawal from the project.

Alternatively if you decide you no longer want to take part in the survey please click on the cross at the top of the webpage and this will close the survey and immediately withdraw you from the study.

**What are the potential disadvantages and risks of taking part?**

Any participation in research can raise sensitive issues or painful emotions but also positive insights. We do not expect that participating in this study will have any detrimental effects on you. It is entirely your choice as to what you want to share with the researchers via the survey. We would also like to reassure you that there are no right or wrong answers and no judgements will be made on the basis of what you write.

**What are the potential benefits of taking part?**

Positive benefits of completing this survey include understanding about some very important areas of research concerning people's body attitudes and the types of health behaviours that people engage in. The findings may also contribute to interventions that aim to promote health.

UWE undergraduate students who participate in this study through the University Psychology Participant Pool will receive a credit for participating in this study.

All other participants will have the opportunity to be entered into a prize draw to win a £20 Amazon voucher.

If you have any questions about this study please contact the Lead Researcher Catrin Griffiths.

Miss Catrin Griffiths  
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### **Help and Support**

If you would like to talk to someone about your emotional health and well-being:

Samaritans is a charity that provides people with emotional support. You can contact their telephone support line **08457 90 90 90** or you can email them on **jo@samaritans.org**.

**Beat** is a charity that provides support for people who have worries about their appearance and those with eating disorders. You can contact their telephone support line on **0845 634 1414** or you can email **help@b-eat.co.uk**.

## Appendix D: Example of Consent Form for study



### Consent Form

Before you take part in the survey, we would like to make sure that you have understood the information we have given so far. Please answer all the following questions honestly.

- |    |  |     |    |
|----|--|-----|----|
| 1. | Do you understand that by consenting to take part in this study you are still able to withdraw (up to four weeks after you've completed the survey), without having to give any reason?                              | Yes | No |
| 2. | Do you understand that you can ask questions about the study by contacting the researcher via email (contact details in the information sheet) after you have completed the study?                                   | Yes | No |
| 3. | Do you understand that you will never be personally identified in any report or write up that stems from this research and that your name will be replaced by a number so that all the data can remain confidential? | Yes | No |
| 4. | Do you confirm that you are over the age of 18?  | Yes | No |
| 5. | Do you consent to taking part in this study?   | Yes | No |

## Appendix E: Demographic Information

What is your age?	_____
What is your gender?	Female      Male
Which of the following describes you?	<p>Please choose an answer from the following drop down answers:</p> <p>White British  White other  Asian or Asian British: Indian  Asian or Asian British: Pakistani  Asian or Asian British: Other  Black or Black British: Black Caribbean  Black or Black British: Black African  Black or Black British: Other Black  Chinese of other Ethic Group: Chinese  Mixed: White and Black Caribbean  Mixed: White and Black African  Mixed: White and Asian  Mixed: other Mixed  Other: .....  Rather not say</p>
What is your martial status?	<p>Please choose an answer from the following drop down answers:</p> <p>Married  Civil partnership  Single, never married  Separated  Divorced  Cohabiting  In a relationship but not living together</p>
What is your highest level of education?	<p>Please choose an answer from the following drop down answers:</p> <p>No formal education  Secondary school/high school  College/ vocational qualification  Undergraduate degree  Masters degree  Doctorate/PHD</p>
Are you a UK resident?	Yes No
What is your height?	<p>Please provide in feet and inches or in centimetres:</p> <p>_____</p>
What is your weight?	<p>Please provide in stone and pounds or kilograms:</p>

Do you consider yourself to be....	<p>Please choose an answer from the following drop down answers:</p> <p>Heterosexual or straight? Gay or lesbian? Bisexual? No sexual orientation? Prefer not to say</p>
Do you consider yourself to be transgender?	<p>Yes No</p>

## **Appendix F: Debriefing Information**

### **Debriefing information**

Thank you so much for completing this survey. You are brilliant! It's people like you that help us to conduct our studies to further develop the field of body image and health behaviour research. We really appreciate your time and input into this study.

#### **Aims of the study**

This study aimed to identify whether different types of thinking styles influence how we feel about our appearance and our related health behaviours. We wanted to know whether people who have more rigid thinking styles might be more likely to feel dissatisfied with their appearance and therefore might be more likely to engage in unhealthy behaviours. Whereas people with more flexible thinking styles might be more satisfied with their appearance and may therefore engage in more healthy behaviours.

The findings from this study will help researchers understand this topic better. The findings may also be used to inform support for people with appearance concerns in the future.

If you have any questions about the study, feel free to contact the lead researcher Catrin Griffiths via email on [catrin.griffiths@uwe.ac.uk](mailto:catrin.griffiths@uwe.ac.uk).

#### **Help and Support**

If after completing this survey, you would like to talk to someone about your emotional health and well-being:

Samaritans is a charity that provides people with emotional support. You can contact their telephone support line **08457 90 90 90** or you can email them on [jo@samaritans.org](mailto:jo@samaritans.org).

**Beat** is a charity that provides support for people who have worries about their appearance and those with eating disorders. You can contact their telephone support line on **0845 634 1414** or you can email [help@b-eat.co.uk](mailto:help@b-eat.co.uk).



### Appendix G: Body Image Psychological Inflexibility Scale (BIPIS)

	Never true	Very seldom true	Seldom true	Sometimes true	Frequently true	Almost always true	Always true
1. I care too much about my appearance	1	2	3	4	5	6	7
2. I shut down when I feel bad about the way I look	1	2	3	4	5	6	7
3. My thoughts and feelings about my appearance must change before I can take important steps in my life	1	2	3	4	5	6	7
4. Worrying about the way I look takes up too much of my time	1	2	3	4	5	6	7
5. I will have better control over my life if I can control my negative thoughts about my appearance	1	2	3	4	5	6	7
6. To control my life, I need to control my appearance	1	2	3	4	5	6	7
7. When I start thinking about the way I look, it is hard to do anything else	1	2	3	4	5	6	7
8. My relationships would be better if my appearance did not bother me	1	2	3	4	5	6	7
9. I realize that my body has flaws, and I accept that	1	2	3	4	5	6	7
10. I define myself by comments others make about my body	1	2	3	4	5	6	7
11. Negative self-evaluations and feelings about my body cause problems in my life	1	2	3	4	5	6	7
12. My negative thoughts about my body keep me from enjoying my life	1	2	3	4	5	6	7
13. If I do not like some part of my body, I do not like myself	1	2	3	4	5	6	7
14. If I could make changes to my body then I would be happy	1	2	3	4	5	6	7

15. My mood is determined by the appearance of my body	1	2	3	4	5	6	7
16. I would spend my life savings or take out a major loan to have a procedure that would correct my physical flaws	1	2	3	4	5	6	7

**Appendix H: Multidimensional Body-Self Relations Questionnaire (MBSRQ) - Appearance Evaluation subscale**

	Definitely disagree	Mostly disagree	Neither agree or disagree	Mostly agree	Definitely agree
1.My body is sexually appealing	1	2	3	4	5
2.I like my looks just the way they are	1	2	3	4	5
3.Most people would consider me good-looking	1	2	3	4	5
4.I like the way I look without my clothes on	1	2	3	4	5
5.I like the way my clothes fit me	1	2	3	4	5
6.I dislike my physique	1	2	3	4	5
7.I am physically unattractive	1	2	3	4	5

### Appendix I: Centre for Appearance Research Valence Scale (CARVAL)

	Strongly disagree	Moderately disagree	Slightly disagree	Slightly agree	Moderately agree	Strongly agree
1.I am satisfied with my physical appearance	1	2	3	4	5	6
2.I don't like the way I look	1	2	3	4	5	6
3.The way I look makes me feel good about myself	1	2	3	4	5	6
4.The way I look makes me unattractive	1	2	3	4	5	6
5.My body and face look pretty much the way I like	1	2	3	4	5	6
6.I feel bad about my body and my appearance	1	2	3	4	5	6
7.I like the way I look	1	2	3	4	5	6
8. My appearance makes me feel attractive	1	2	3	4	5	6

**Appendix J: Body Appreciation Scale-2 (BAS-2)**

	Never	Seldom	Sometimes	Often	Always
1. I respect my body	1	2	3	4	5
2. I feel good about my body	1	2	3	4	5
3. I feel that my body has at least some good qualities	1	2	3	4	5
4. I take a positive attitude towards my body	1	2	3	4	5
5. I am attentive to my body's needs	1	2	3	4	5
6. I feel love for my body	1	2	3	4	5
7. I appreciate the different and unique characteristics of my body	1	2	3	4	5
8. My behavior reveals my positive attitude toward my body; for example, I walk holding my head high and smiling	1	2	3	4	5
9. I am comfortable in my body	1	2	3	4	5
10. I feel like I am beautiful even if I am different from media images of attractive people (e.g., models, actresses/actors)	1	2	3	4	5

**Appendix K: Internalisation general subscale of the Sociocultural Attitudes Toward Appearance Questionnaire Revised (SATAQ-3)**

	Definitely disagree	Mostly disagree	Neither agree or disagree	Mostly agree	Definitely agree
1. I <u>do not</u> care if my body looks like the body of people who are on TV.	1	2	3	4	5
2. I compare my body to the bodies of people who are on TV.	1	2	3	4	5
3. I would like my body to look like the models who appear in magazines.	1	2	3	4	5
4. I compare my appearance to the appearance of TV and movie stars.	1	2	3	4	5
5. I would like my body to look like the people who are in movies.	1	2	3	4	5
6. I <u>do not</u> compare my body to the bodies of people who appear in magazines.	1	2	3	4	5
7. I wish I looked like the models in music videos.	1	2	3	4	5
8. I compare my appearance to the appearance of people in magazines.	1	2	3	4	5
9. I <u>do not</u> try to look like the people on TV.	1	2	3	4	5

**Appendix L: Perceived Sociocultural Pressures Scale (PSPS)**

	<b>Never</b>	<b>Seldom</b>	<b>Sometimes</b>	<b>Often</b>	<b>Always</b>
1. I've felt pressure from my friends to lose weight	1	2	3	4	5
2. I've noticed a strong message from my friends to have a thin body	1	2	3	4	5
3. I've felt pressure from my family to lose weight	1	2	3	4	5
4. I've noticed a strong message from my family to have a thin body	1	2	3	4	5
5. I've felt pressure from people I've dated to lose weight	1	2	3	4	5
6. I've noticed a strong message from people I've dated to have a thin body	1	2	3	4	5
7. I've felt pressure from the media (e.g. TV, magazines) to lose weight	1	2	3	4	5
8. I've noticed a strong message from the media to have a thin body	1	2	3	4	5

### Appendix M: Eating Attitudes Test- 26 (EAT-26)

	Always	Usually	Often	Some times	Rarely	Never
1. Am terrified about being overweight	1	2	3	4	5	6
2. Avoid eating when I am hungry	1	2	3	4	5	6
3. Find myself preoccupied with food	1	2	3	4	5	6
4. Have gone on eating binges where I feel that I may not be able to stop	1	2	3	4	5	6
5. Cut my food into small pieces	1	2	3	4	5	6
6. Aware of the calorie content of foods that I eat	1	2	3	4	5	6
7. Particularly avoid food with a high carbohydrate content (i.e. bread, rice, potatoes, etc.)	1	2	3	4	5	6
8. Feel that others would prefer if I ate more	1	2	3	4	5	6
9. Vomit after I have eaten	1	2	3	4	5	6
10. Feel extremely guilty after eating	1	2	3	4	5	6
11. Am preoccupied with a desire to be thinner	1	2	3	4	5	6
12. Think about burning up calories when I exercise	1	2	3	4	5	6
13. Other people think that I am too thin	1	2	3	4	5	6
14. Am preoccupied with the thought of having fat on my body	1	2	3	4	5	6
15. Take longer than others to eat my meals	1	2	3	4	5	6
16. Avoid foods with sugar in them	1	2	3	4	5	6
17. Eat diet foods	1	2	3	4	5	6
18. Feel that food controls my life	1	2	3	4	5	6
19. Display self-control around food	1	2	3	4	5	6
20. Feel that others pressure me to eat	1	2	3	4	5	6
21. Give too much time and thought to food	1	2	3	4	5	6
22. Feel uncomfortable after eating sweets	1	2	3	4	5	6
23. Engage in dieting behavior	1	2	3	4	5	6
24. Like my stomach to be empty	1	2	3	4	5	6
25. Have the impulse to vomit after meals	1	2	3	4	5	6
26. Enjoy trying new rich foods	1	2	3	4	5	6



Appendix N: The Measurement Model

