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An Experimental Investigation of Body Displacement Theory in Restrained Eaters

Danielle Elizabeth MacDonald
Ryerson University

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AN EXPERIMENTAL INVESTIGATION OF BODY DISPLACEMENT THEORY IN
RESTRAINED EATERS

by

Danielle Elizabeth MacDonald

Bachelor of Fine Arts (Honours), York University, Toronto, Ontario, 2010

A thesis

presented to Ryerson University

in partial fulfillment of the

requirements for the degree of

Master of Arts

in the Program of

Psychology

Toronto, Ontario, Canada, 2012

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An Experimental Investigation of Body Displacement Theory in Restrained Eaters

Master of Arts, 2012

Danielle Elizabeth MacDonald

Psychology

Ryerson University

Abstract

Body Displacement Theory posits that individuals with eating and weight concerns may mislabel feelings of ineffectiveness as feeling fat. Study 1 used a non-clinical sample to create an Implicit Association Test for body image (IAT-BI) to measure implicit body dissatisfaction, as body displacement is thought to be an automatic cognitive/affective process. The IAT-BI was moderately and significantly correlated with explicit measures of body dissatisfaction, body shame, and restrained eating. In Study 2, an experimental manipulation was used to induce ineffectiveness in a non-clinical sample, and effects on implicit and explicit body image and related variables were measured. Contrary to hypotheses, feeling ineffective did not lead to feeling fat in comparison to those in a control condition. These findings may suggest that body displacement was not successfully induced by the manipulation, or that body displacement may be process unique to those with eating disorders. The implications of the study are discussed.

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An Experimental Investigation of Body Displacement Theory in Restrained Eaters

Introduction

Body Displacement Theory posits that many women, particularly those with eating disorders, tend to project or “displace” negative feelings onto their bodies, in order to render these problems more controllable (Jasper, 1993). This theory is often used in clinical settings to explain why patients with eating disorders report that they “feel fat” following negative experiences (McFarlane, Urbszat, & Olmsted, 2011). Other research has suggested that non-clinical, body preoccupied individuals may also report feeling fat following negative emotions (Coelho, Carter, McFarlane, & Polivy, 2008). Despite this, however, Body Displacement Theory has rarely been tested experimentally, meaning that the causal relationship between “feeling ineffective” and “feeling fat” in women has remained unarticulated, and warranted its further exploration from an experimental perspective.

Body displacement may be an automatic process, and as such, in order to assess this construct, a valid measure was required to tap implicit changes in state body dissatisfaction or feelings of fatness. Additionally, a test that measures body dissatisfaction implicitly would avoid the demand characteristics and ceiling effects that might be expected using explicit measures, as explicit questioning about body image can in fact activate or trigger feelings of body dissatisfaction. As such, the first goal of the current study was to develop an “Implicit Association Test” for body image (IAT-BI). The Implicit Association Test is a well-validated measure that has been used to assess implicit attitudes of various sorts (Greenwald, McGhee, & Schwartz, 1998). This measure has been adapted for a number of eating and body-related attitudes, such as internalization of the thin-ideal (Ahern, Bennett, & Hetherington, 2008) and anti-fat attitudes (O’Brian, Hunter, Halberstadt, & Anderson, 2007). However, no published

studies of an IAT for body image, which differs in that these attitudes are directed towards the self rather than towards others, could be located. As such, this gap in the literature necessitated the development of a new measure. The IAT-BI was developed, and its preliminary validation utilized an undergraduate sample and established measures of body image and eating-related constructs. This permitted the use of this measure in the study investigating body displacement.

The secondary goal of the current study was to experimentally induce body displacement in a non-clinical sample of women using an “ineffectiveness” manipulation. It was expected that restrained eaters would respond to task failure with elevations in implicit and state body dissatisfaction compared to unrestrained eaters. The results of the study were used to further clarify the nature of body displacement in non-clinical women with eating and body-related concerns.

Body Displacement Theory

Origins of Body Displacement Theory

The idea that individuals with eating and weight concerns may misattribute negative emotions about themselves to their bodies began with Hilde Bruch’s (1978) seminal book on anorexia nervosa (AN). Bruch described young women and girls with AN as feeling unable to fulfill lofty expectations that they perceive as having been placed upon them. She posited that a woman with AN attempts to meet the demands placed upon her, and when she believes that she cannot, she escapes from her feelings of inadequacy by exacting excessive control over her own body, generally by restricting food intake. Bruch has argued that girls and women with AN are plagued by feelings of ineffectiveness and loss of control over their own lives, and that their descent into eating disorders is the result of this. Control of their bodies, she has argued, becomes an obsession – a replacement for the control they lack in other areas of their lives and a

manifestation of the profound and deep-seated feelings of ineffectiveness that they believe characterize themselves. Bruch has made the case that weight loss, although a primary symptom of AN, is not the underlying psychopathology of the disorder but rather a manifestation of attempts to control negative feelings about the self. As such, according to Bruch, women with AN engage in body displacement, in which they displace their generalized feelings of ineffectiveness onto their bodies, which results in feelings of fatness and a need to control eating and weight.

Contemporary Theorizing on Body Displacement

Bruch's ideas have influenced contemporary theorizing about body displacement. Feeling fat is an experience with which most women are familiar, regardless of their weight or body shape, and has often been regarded as being associated with negative emotions rather than any objective evaluation of the body (Jasper, 1993; Silberstein, Striegel-Moore, & Rodin, 1987). Jasper (1993) has argued that because contemporary Western culture promotes the widespread objectification of women's bodies for display and scrutiny by others, many women learn to self-objectify, and as a result become disconnected from their own bodily experiences. This may allow women to use their bodies as objects or targets for displacement of negative emotions, which may manifest as feeling fat. This is similar to Fairburn and colleagues' (2008) argument that individuals with eating disorders mislabel their negative emotions as feeling fat. Jasper has explained this by positing that many women often experience negative emotions about the self (e.g., shame, inadequacy or ineffectiveness) as intolerable, and that displacing these feelings onto the body may help an individual cope with her emotions in a number of ways. First, rather than believing that the issue (e.g., ineffectiveness) is universally true of oneself, women may localize distress to one part of their identity – the body – which may reduce its potency. Body

displacement may also help women to avoid overwhelming and intolerable ideas by changing them at their core. For example, rather than *being* out of control, an idea that may be unbearable, one may transform this into the more tolerable feeling that her weight is out of control. Lastly, this process may help women to believe that there are more tangible ways to cope with distress. For example, although the solution to being an ineffective *person* may be unclear, the solution to being “too fat” appears simple – the individual “merely” has to lose weight.

Feeling Fat in Non-Clinical Women

As discussed, although many writers have discussed feeling fat with specific reference to eating disorders (e.g., Fairburn et al., 2008), others have noted that it may be common to many women and not limited to those with psychopathology (e.g., Jasper, 1993). This may be perhaps a manifestation of the “normative discontent” – widespread and culturally normative body dissatisfaction – that is typical to average women (Rodin, Silberstein, & Striegel-Moore, 1984). Indeed, feeling fat has been shown to be significantly correlated with both restrained eating and body dissatisfaction in non-clinical women, even when body mass index (BMI) is controlled (Wardle & Foley, 1989). This indicates that women without eating disorders do report feeling fat, and that those with eating and weight concerns may be more likely to do so. In fact, Tiggemann (1996) reported a discrepancy between the body size that undergraduate women *think* they have and the body size they *feel* they have. That is, non-clinical women reported “feeling” fatter than they believed themselves to *actually* be (Tiggemann, 1996). These findings support the contention that feeling fat has an important affective component that may be distinct from cognitive appraisals of body size (regardless of the accuracy of these appraisals). Finally, feeling fat has also been reported as significantly more common in women compared to men (Ogden and Munday, 1996), suggesting that this may be an experience that is particularly

relevant, salient, or common to women within our current Western sociocultural context that values thinness and relegates fatness.

Other studies have examined factors that may be related to feeling fat in non-clinical samples. For example, Striegel-Moore, McAvay, and Rodin (1986) assessed correlates of feeling fat in 46 undergraduate students using a reliable 7-item scale that they adapted for this study. Using a stepwise regression analysis, they found that 71% of the variance in feeling fat was accounted for by the following variables, all of which made significant independent contributions to the model: percent overweight; perfectionism; pressure towards thinness; social comparisons; and feelings of failure. Not surprisingly, feeling fat was also significantly associated with binge eating, dieting, and loss of control over eating (Striegel-Moore et al., 1986). Particularly relevant is the relationship between feelings of failure and feelings of fatness, as this is similar to central tenet of Body Displacement Theory. Although correlational studies such as this are unable to establish a causal relationship between these variables, establishment of a relationship between feelings of failure and feelings of fatness begin to provide some partial support for this theory.

In an exploratory study of feeling fat using qualitative and quantitative methodology, Cooper, Deepak, Grocutt, and Bailey (2007) interviewed women with AN as well as non-clinical dieters and non-dieters. Both dieters and non-dieters reported experiences of having felt fat, though dieters reported having felt this more recently. In the non-clinical women (both dieters and nondieters), some of the qualitative experiences identified by participants as related to feeling fat included: feelings of frustration with the self; thoughts of not being good enough; beliefs of oneself as a failure; and reflections on the first recalled experience of feeling fat as related to thoughts of oneself as bad, worthless or insignificant. These suggest that feelings of

fatness in non-clinical individuals may be related to negative emotions and cognitions about the self as a failure, and that such individuals may appraise feelings of fatness as having broader relevance to their self-concept rather than being circumscribed to body weight and shape. These findings also highlight the importance of experimentally investigating the relationship between negative emotions and feeling fat in order to identify direction of causality between feelings of ineffectiveness and feeling fat, which is a primary goal of the present study.

Ineffectiveness and Negative Emotions as Correlates of Restrained Eating

Body Displacement Theory postulates that ineffectiveness or feelings of failure may be important triggers for feeling fat, with the body displacement mechanism being the mislabelling of these emotions. In addition to the aforementioned studies describing the relationship between ineffectiveness and feeling fat in women, there is also a substantial literature describing ineffectiveness as an important correlate of eating and weight concerns in restrained eaters (chronic dieters). Restrained eaters are characterized by rigid cognitive “rules” about food and eating, as well as regular periods of inhibited eating, generally to control weight, punctuated by bouts of disinhibition (Polivy & Herman, 1991). Much of the research documenting the link between ineffectiveness and eating concerns is correlational, and does not specifically address feeling fat, but nevertheless has established that feelings of ineffectiveness tend to be elevated in chronic dieters.

In one study, Ackard, Croll, and Kearney-Cooke (2002) recruited 506 female university students and assessed frequency of dieting behaviours, eating disorder symptoms, body image, and related psychological constructs. Dieting was assessed using a single item, “Have you ever dieted to lose weight?”, to which respondents indicated on a five-point Likert scale the number of times they had done so, ranging from never to more than 15 times. They found that

individuals who indicated having dieted six or more times scored significantly higher on the Eating Disorder Inventory (EDI) Ineffectiveness subscale, which measures generalized feelings of inadequacy, insecurity, worthlessness and loss of control over one's life (Garner, Olmsted & Polivy, 1983), compared to moderate dieters (1-5 times) and never dieters (Ackard et al., 2002). These findings suggest that chronic dieters may be characterized by elevated feelings of generalized ineffectiveness.

In a similar study, Cachelin, Striegel-Moore, and Paget (1997) recruited 101 female college students for a study comparing body image, psychopathology and related concerns based on degree of dietary restraint. Participants were screened for history of eating disorders. Participants were divided into three dieting groups based on scores on the Restraint Scale: nondieters, medium-restraint, and chronic dieters. Chronic dieters exhibited significantly higher EDI Ineffectiveness scores compared to medium-restraint participants and nondieting participants (Cachelin et al., 1997). These findings together suggest that individuals characterized by chronic dieting may be more likely to endorse feelings of ineffectiveness.

More recently, Ferrier and Martens (2008) considered the relationship between perceived incompetence and eating behaviours. They argued that perceived incompetence – perceptions of oneself as substandard in one or more domains – is similar to both ineffectiveness and task failure, both of which have been linked to dieting and disordered eating. They created and validated a measure of perceived incompetence in 12 domains of life (e.g., job, school, interpersonal domains, intellectual ability), and investigated the relationship between these constructs and scores on the Eating Attitudes Test (EAT) in 403 female and male undergraduates. They found that EAT scores were significantly correlated with perceived incompetence in the following domains: Job competence; scholastic competence; social

acceptance; appearance; close friendships; intellectual ability; morality; romantic relationships; humour; and creativity. These findings complement those reported previously by suggesting that individuals who perceive themselves to be substandard in domains unrelated to eating or the body may also be more likely to exhibit disordered eating behaviours, although the directionality of this relationship remains unclear. It is also important to note that these results may be accounted for by scores on global self-worth, and/or self-esteem, both of which were significantly correlated with EAT scores and all perceived incompetence subscales.

Negative emotions other than ineffectiveness and perceived incompetence may also be related to eating behaviours. In a recent study of adolescents, Norwood and colleagues (2011) used discriminant function analysis to investigate variables that may differentiate restrained eaters, emotional eaters, and healthy eaters (as defined by the Dutch Eating Behavior Questionnaire; van Strien, Frijters, Bergers, & Defares, 1986). They found that both restrained eaters and emotional eaters could be differentiated from healthy eaters by scores on self-silencing, that is, the tendency to inhibit one's true thoughts and feelings in order to avoid interpersonal confrontation. Surprisingly, restrained eaters and emotional eaters did not differ from one another on this construct, suggesting that self-silencing may be broadly related to problematic eating behaviours. In addition, they found that both restrained and emotional eaters had higher levels of both anger suppression and anger expression than the healthy eaters. These findings complement previous studies by suggesting that problematic eating behaviours may be related to a variety of negative emotions as well as emotional inhibition and expression.

In a prospective study examining predictors of bulimic symptoms and restrained eating, Cooley and Toray (2001) measured body image, BMI, eating disorder psychopathology, restrained eating, mood and anxiety from 225 female college students. These constructs were

used to predict bulimic symptoms and restrained eating at a three-year follow-up using hierarchical regression. It was found that, after controlling for baseline bulimia symptoms, baseline EDI Ineffectiveness and the Profile of Mood States (POMS) Vigor subscale (a measure related to energetic mood) had significant unique contributions in predicting bulimia symptoms at the 3-year follow-up (POMS Negative Affect, and Public Self-Awareness scores were non-significant in this block of the hierarchical model). Similarly, after controlling for baseline restraint, baseline EDI Ineffectiveness scores significantly predicted restraint at the 3-year follow-up (POMS Vigor, POMS Negative Affect, and Public Self-Awareness scores were non-significant in this block of the hierarchical model). In both models, adding baseline figure dissatisfaction in a third hierarchical block significantly improved variance accounted for by Block 2. These findings suggest that feelings of ineffectiveness may have a stable association to restrained eating and disordered eating symptoms over a period as long as three years, which further bolsters assertions that ineffectiveness may be importantly related to weight and eating concerns.

Collectively, the findings of these studies provide evidence for ineffectiveness as an important factor in restrained eaters, a relationship that is essential to Body Displacement Theory. However, it must be noted that none of these studies used an experimental methodology and therefore cannot account for the role of ineffectiveness as a cause of feeling fat.

The Relationship between Negative Emotions and Eating in Restrained Eaters

As has been discussed, it has been suggested that body displacement may occur in women with non-clinical eating and weight concerns. Clinical literature suggests that disordered eating behaviours such as binge eating, compensatory behaviours, or food restriction may be consequences of feeling fat for those with eating disorders (McFarlane et al., 2011; Silberstein et

al., 1987). If Body Displacement Theory is indeed accurate, the body displacement mechanism may be such that feeling ineffective leads to feeling fat, and feeling fat is responded to with disordered eating behaviours. Although restrained eaters and those with eating disorders are certainly qualitatively different in many ways, it is possible that if body displacement does occur in restrained eaters, problematic eating behaviours may be consequences of the body displacement process in this group as well. As such, examination of the relationship between failure experiences and eating behaviours in restrained eaters helps to further elucidate the investigation of body displacement as a potential mechanism in those with eating and weight concerns.

Emotional Distress and Disinhibited Eating

It is well-established in research literature that restrained eaters alternate between periods of restraint and periods of disinhibited eating (e.g., Polivy & Herman, 1985). In fact, bouts of disinhibited eating are nearly ubiquitous in restrained eaters and are thought to be directly related, at least in part, to the physiological and cognitive effects of dieting (Polivy & Herman, 1985). Relating to this, the relationship between emotions and subsequent problematic eating behaviours in dieters has been considered extensively. Specifically related to body displacement, the idea that failure and/or emotional distress may be particularly salient for restrained eaters has been investigated in numerous studies.

In one study, 80 female undergraduates were divided into restrained and unrestrained eating categories based on scores on the Restraint Scale, and were asked to complete a logic puzzle, after which they were given one of four types of failure feedback (Heatherton, Polivy, Herman, & Baumeister, 1993). In the simple failure condition, participants were confronted by a dumbfounded experimenter who expressed disbelief that they had been unable to finish the task,

and then were given feedback that they had done poorly. In the failure/videotape condition, participants were videotaped completing the task, received the same failure feedback as in the simple failure condition, and then were asked to review the tape to determine where they went wrong during the puzzle. In the failure/distraction condition, participants were treated identically to the simple failure condition, but after which they were asked to watch a 10-minute video about sheep as a distraction strategy. In the control condition, participants were provided with a variety of puzzles and asked to state their favourite. Participants then completed measures of mood and state self-esteem that served as manipulation checks, followed by an eating task disguised as a taste test. The results indicated a significant restraint by condition interaction. Restrained eaters in the simple failure and failure/distraction conditions ate more ice cream than restrained eaters in the control and failure/videotape conditions, as well as compared to unrestrained eaters in all conditions (Heatherton et al., 1993). These results suggest that failure experiences may result in disinhibited eating for restrained eaters. The authors hypothesized that disinhibited eating may function to allow restrained eaters to escape from the awareness of oneself as a failure that the self-referent threat provides. However, they also noted that high-levels of self-awareness of this threat, such as that in the videotape condition, may make escape from self-awareness difficult and which may account for the differential eating behaviours exhibited by participants in this group.

In another similar study, one condition received a self-referent threat, in which they failed at an ostensibly simple logic puzzle, the Spin Out game, while the second group received a negative mood induction using sad music, and thus was irrelevant to the self (Heatherton, Strieppe, & Wittenberg, 1998). When the threat was ambiguous (i.e., participants received no explanation for the source of their negative affect), restrained eaters, identified by scores on the

Restraint Scale, ate more regardless of whether the threat was self-relevant or not (Heatherton et al., 1998). However, when participants received an explanation for the source of their dysphoria (i.e., that they had been experimentally induced into a negative mood, either via the task failure manipulation or the sad music manipulation), dieters and non-dieters ate similar amounts (Heatherton et al., 1998). These results elaborate on those in the previously reported study by suggesting that when restrained eaters are unable to make attributions for the source of their distress, these feelings may be perceived as threatening and that they may seek to escape their dysphoria by focusing on a narrower target such as eating. However, when they understand the source of their dysphoria, restrained eaters may no longer regard it as threatening and thus may not feel compelled to escape from their emotions in the same way.

Collectively, the findings of these two studies support the mechanism explained by Heatherton and Baumeister's (1991) Escape Theory of binge eating – that individuals may lose control of eating to escape self-awareness. Importantly, the authors articulated this theory within the context of a range of behaviours characterized by loss of control over eating, ranging from disinhibited eating in dieters to binge eating in those with BN (Heatherton & Baumeister, 1991). As such, this theory is posited to explain not only clinically significant binge eating episodes, but also the disinhibition of dietary restraint that is commonly observed in dieters. The Escape Theory has proposed that failure experiences lead to aversive or intolerable levels of self-awareness in chronic dieters and bulimics, and that escape from self-awareness results in narrowing cognitions to a focus on the immediate present, decreased inhibitions, and eventually binge eating in these individuals (Heatherton & Baumeister, 1991). This theory has posited that perceptions of the self as ineffective – a central tenet of Body Displacement Theory – may lead to disinhibited or binge eating in such individuals as a means of escape from aversive emotions.

In support of this, the reported studies (i.e., Heatherton et al., 1993; Heatherton et al., 1998) provide some evidence to suggest that restrained eaters may indeed attempt to escape from the self-awareness triggered by failure experiences or ambiguous emotional distress via disinhibited eating. Such findings are consistent with theorizing that body displacement may occur to reduce the aversion of focusing on the self as a failure, and suggest that this process may result in the narrowing of cognitive focus to more a controllable target.

This idea was investigated by Polivy and Herman (1999), who examined the theory that dieters may mask their distress about uncontrollable aspects of their lives by focusing on the ostensibly more controllable target of overeating. They recruited 137 female university students for their study and divided them into restraint groups based on scores on the Restraint Scale. Participants were randomly assigned to one of three failure conditions: no distress; unlabeled distress (failure on a cognitive task); or labeled distress (failure on a cognitive task, and following which they were told they likely felt poorly because of their performance). Following the failure, participants were asked to taste test three ice cream flavours. Half of the participants were asked to taste one spoonful of each flavour, whereas the other half were given ad libitum access to as much ice cream as they wanted. It was hypothesized that dieters with no attributions for their negative emotions (i.e., in the unlabeled failure condition) would overeat and then attribute their negative emotions to having overeaten. That is, the authors hypothesized that the opportunity to overeat may allow dieters to misattribute their distress, which is similar to body displacement, in which negative emotions are misattributed to the body.

The findings indicated that restrained eaters attributed significantly more of their negative affect to eating compared to unrestrained eaters (Polivy & Herman, 1999). Additionally, an interaction between restraint and eating condition indicated that restrained eaters who had the

opportunity to overeat attributed significantly more negative affect to eating than restrained eaters without the opportunity to overeat, as well as compared to unrestrained eaters. Finally, the interaction between restraint and failure also approached significance, in that restrained participants were more likely to attribute their eating to negative emotions after the three failure conditions compared to restrained eaters in the control condition or unrestrained eaters in the failure conditions (Polivy & Herman, 1999). These results provide some support for the researchers' hypotheses, in that restrained eaters were more likely to attribute their negative emotions to a plausibly more controllable cognitive target – eating – than the failure experience. They were also more likely believe their eating was because of negative emotions if they had experienced failure. Recall that Body Displacement Theory argues that negative emotions may be displaced onto a more controllable cognitive target such as the body, and that theoretically, for restrained eaters this might result in coping using eating. As such, the findings of this study may suggest some partial support for body displacement in that it suggests that restrained eaters may attempt to avoid feelings of failure by misattributing negative emotions to a controllable cognitive target such as overeating or feeling fat.

Collectively, the findings of the reported studies indicate that when confronted with feelings of failure or other types of emotional distress, particularly when lacking attributions for the source of distress, restrained eaters may be likely to engage in disinhibited eating. Body Displacement Theory suggests that negative emotional experiences may be mislabelled as feeling fat, and logic follows that that in this group, feeling fat may be responded to with problematic eating behaviours. Although the reported studies did not examine feeling fat as a mechanism between emotional distress and disinhibited eating, the experimental evidence that distress impacts overeating in dieters provides some indirect evidence supporting this theory.

Emotional Distress and Increased Restraint

In addition to disinhibited eating, studies have examined increased restraint in response to failure experiences for restrained eaters. Recall the previously described study by Heatherton and colleagues (1993). Those who received failure feedback were made self-aware of their failure by watching a video of the event, distracted using an unrelated video, or asked to sit quietly in the simple failure condition. As discussed, in those conditions that fostered low self-awareness – the distraction condition and the simple failure condition – restrained eaters demonstrated disinhibited eating (Heatherton et al., 1993). However, those restrained eaters who were made highly self-aware following the failure feedback continued to restrain their eating, suggesting that individuals who are unable to disengage from the idea of themselves as ineffective may not be able to escape from negative emotions. Rather, they may seek to exert control over their bodies and eating as a way to transform the target of their distress from themselves as ineffective, into something more manageable, tangible and realistic.

Similarly, Stephens, Prentice-Dunn, and Spruill (1994) divided 96 participants into restrained and unrestrained eating condition based on scores on the Restraint Scale. Participants completed a computer task, during which they received either success feedback or failure feedback. They were also randomly assigned to one of two self-awareness conditions. In the high public self-awareness condition, a video camera was positioned in the testing room to give participants the impression that others would observe their performance, whereas in the low public self-awareness condition, there was no video camera. Following this induction, participants completed a manipulation check and a taste test disguised as a measure of physiological perception. Similar to the previous studies, participants exposed to failure feedback and in the low self-awareness condition engaged in disinhibited eating. In contrast, when

participants in the high public self-awareness condition - in which they believed others would observe their eating – were given failure feedback, they maintained their restraint over eating (Stephens et al., 1994). These findings may suggest that depending on whether restrained eaters either maintain or escape from focus on their distress may impact the ways in which their eating is affected. However, it is also important to note that these findings may be accounted for by the presence of perceived judgment from others, rather than true maintenance of focus on distress. Research has indicated that self-presentation and self-regulation are intimately tied, and that individuals frequently regulate their behaviours as a means of impression management in the presence of others (Vohs, Baumeister, & Ciarocco, 2005). Moreover, such regulation has been shown to be less effortful and less psychologically taxing when one manages a self-presentation that is consistent with his or her desired image (Vohs et al., 2005). It may be important for dieters to convey a self-presentation of control over eating, and as such, the findings obtained by Stephens and colleagues (1994) may be partially accounted for by participants' expectation that others would witness their behaviour.

Finally, Rezek and Leary (1991) found that when non-eating disordered participants with a high drive for thinness experienced low perceived control over a social situation, they responded by eating less and indicating that they intended to eat less later in the day than did similar participants who experienced high control. Participants who endorsed low drive for thinness were unaffected by the manipulation. The authors have explained their findings in terms of “displaced reactance” (p. 130), in which they argued that the participants' inability to perceive control in one area resulted in amplified motivation to control other areas of their lives (Rezek & Leary, 1991). These findings support Body Displacement Theory and echo the arguments about body displacement put forth by Bruch (1978), in which feelings that one is an ineffective person

are responded to with food restriction to transform uncontrollable problems with the self into controllable food- and body-related issues. Although Bruch was specifically referring to women with AN, these results may provide an analog to her theory in that under some conditions, restrained eaters may similarly cope with distress by maintaining restraint. Indeed, evidence suggests that although attempts to maintain self-control often deplete resources and lead to disinhibition, repeated practice at exercising self-control can in fact strengthen one's ability to maintain control over time, similar to the conditioning of a muscle (Muraven & Baumeister, 2000). The current study attempted to extend support provided by Rezek and Leary's (1991) contention about displaced reactance in restrained eaters by experimentally testing the body displacement mechanism.

Experimental Testing of Body Displacement Theory

Although there are a number of studies suggesting that restrained eaters may be characterized by feelings of ineffectiveness, may often experience feelings of fatness, and may respond to failure experiences or other types of emotional distress with disinhibited eating or increased restraint depending on context, few studies have sought to experimentally test Body Displacement Theory. That is, few studies have directly tested the proposed mechanism that feelings of ineffectiveness may lead to "feeling fat". In fact, although this theory emerged in the eating disorder literature and studies with both clinical and non-clinical samples have linked negative affect and cognitions about ineffectiveness to eating behaviours, offering partial support for the existence of this process, they largely present correlational or otherwise indirect evidence. Indeed, only a handful of studies have experimentally attempted to elucidate the mechanism proposed to underlie body displacement – the mislabelling of more global feelings of failure or ineffectiveness into emotions about the body.

A study by Forbush and Watson (2006) offers some partial support for Body Displacement Theory in clinical populations by demonstrating that individuals with eating disorders may be more emotionally inhibited than are non-disordered individuals. Women with anorexia nervosa (AN), bulimia nervosa (BN), and without eating disorders were compared on a battery of questionnaires relating to personality and psychopathology. Unfortunately, restrained eating was not assessed in the non-clinical sample. They found that women with eating disorders scored significantly higher on a variety of measures relating to emotional inhibition. The authors have argued that emotional inhibition may result in internalizing emotional distress and confusing generalized emotions about non-body topics with body-related emotions, thereby escalating feelings of fatness during more generalized negative emotional experiences (Forbush & Watson, 2006). Because a central tenet of Body Displacement Theory is that more global feelings are transformed into feelings about the body, and that feelings of fatness may be the result of such displacement, their arguments about the confusion of generalized emotions and emotions specifically related to the body may support Body Displacement Theory, although their hypothesis about these findings remains untested.

Thus far, only a small number of studies have attempted to directly and experimentally test Body Displacement Theory in either eating disorder individuals or restrained eaters. An early study by Eldredge, Wilson, and Whaley (1990) examined whether women with body-weight schemas would be likely to respond to failure experiences by attending to and evaluating their own bodies. Restrained and unrestrained eaters were randomly assigned to either failure or success conditions, and body dissatisfaction was measured as an outcome variable using the Body Shape Questionnaire (trait measure), the Semantic Differential (state measure) and a measure developed for the study called the Body Image Self-Evaluation (state measure). In

contrast to Body Displacement Theory, they found that failure experiences, represented by being asked to solve difficult verbal analogies, did not result in restrained eaters “feeling fat” or otherwise worse about their bodies (Eldredge et al., 1990). Although two of the outcome measures used were state measures of body dissatisfaction (the type of body dissatisfaction expected to be impacted by body displacement), the authors explained that their measures might not have been sufficiently sensitive to detect effects. They also suggested that perhaps failure experiences lead to generalized negative self-evaluation rather than body-related negative evaluation (Eldredge et al., 1990).

A more recent study examined whether an anxiety-provoking induction would result in increased feelings of fatness (Coelho et al., 2008). The authors randomly assigned participants with eating disorders, and restrained and unrestrained eaters to either an anxiety condition or a control condition (Coelho et al., 2008). The results demonstrated that only restrained eaters reported more feelings of fatness, measured by the Thought Shape Fusion Scale, following the anxiety induction, whereas unrestrained eaters and eating disorder participants were not affected in this way (Coelho et al., 2006). These findings are inconsistent with the findings obtained by Eldredge and colleagues (1990), and suggest that body displacement may indeed occur in restrained eaters. These findings are noteworthy in that a body displacement effect was observed in the restrained eating group but not the eating disorder group, suggesting that the body displacement mechanism may be activated differentially in clinical and non-clinical individuals. One explanation is that the anxiety induction used in this study may not have resulted in the type of emotional distress necessary for body displacement to occur in those with eating disorders, but that at the same time, this induction was salient and relevant to the restrained group. Perhaps

performance anxiety is more relevant to non-clinical individuals, who are less functionally impaired, whereas those with eating disorders may be more affected by other types of concerns.

In a third study, McFarlane and colleagues (2011) randomly assigned participants with eating disorders, and restrained and unrestrained eaters to either a control condition or a body displacement induction condition. In the induction condition, participants were asked to think about a time in their lives when they felt very inadequate or unsuccessful, such as a time that they failed or received a negative remark about their abilities. Patients with eating disorders demonstrated significant differences in implicit appearance-related processing (measured using the Word Stem Completion Task) between conditions. This indicates that patients in the ineffectiveness condition exhibited more activation of body- and appearance-related cognitive schemas compared to those in the control condition (McFarlane et al., 2011). This effect was not observed in the restrained or unrestrained eaters. The authors concluded that these differences represent a body displacement effect in the clinical group, in that feeling ineffective resulted in increased activations of appearance and weight schemas only for participants with eating disorders (McFarlane et al., 2011). These results provide support for Body Displacement Theory, demonstrating that feelings of ineffectiveness may result in increased attention to weight and shape in those with eating disorders. Findings that restrained eaters were not similarly affected by the induction are in contrast to those reported by Coelho and colleagues (2008) but similar to those obtained by Eldredge and colleagues (1990), and suggest that restrained eaters may be qualitatively different from individuals with eating disorders. As such, it is possible that body displacement processes occur for both eating disordered individuals and non-clinical weight-concerned individuals, but that these groups experience unique and distinct triggers for this mechanism.

In addition, the use of an implicit dependent measure is a strength of McFarlane and colleagues' (2011) study, because body displacement is thought to be an automatic process. Not only are self-report measures subject to demand characteristics, but in many cases they may not be sensitive enough to detect automatic processes. However, because McFarlane and colleagues (2011) used an implicit measure of cognitive processing of appearance-related schemas (i.e., cognitive focus on appearance-related constructs), as opposed to implicit body dissatisfaction or feeling fat (i.e., evaluative disliking of one's own body), it is possible that this measure was not sensitive or direct enough to detect a body displacement effect in restrained eaters. Indeed, literature suggests that weight and shape schemas are chronically and easily accessible for individuals with eating disorders (e.g., Vitousek & Hollon, 1990), and as such, it is possible that the observed effects in eating disorder patients but not restrained eaters reflect this. A measure that more directly assesses implicit body dissatisfaction would improve upon this outcome measure and would permit more direct experimental testing of Body Displacement Theory.

The Current Study

A Gap in the Literature

Although Bruch conceptualized the idea of body displacement more than 30 years ago, and although clinical anecdotes report that "feeling fat" is commonplace for both individuals with eating disorders and non-clinical women following distressing experiences, there are few studies that have sought to experimentally examine the existence of this phenomenon. As such, the current study will respond to this gap in the literature by being only the fourth known experimental investigation of Body Displacement Theory.

Study 1: Implicit Association Test for Body Image (IAT-BI)

In order to facilitate the experimental testing of body displacement, an implicit measure of body image was required to tap subtle and automatic changes in one's body dissatisfaction that may not be available to explicit awareness. McFarlane and colleagues (2011) obtained affirmative results in their body displacement study using an implicit measurement of appearance-related processing, but in the present study we wanted to assess implicit body dissatisfaction. This would allow us to more directly measure the hypothesized outcome of body displacement – feeling fat. Because cognitive-behavioural models have suggested that body dissatisfaction is largely a cognitive process, in that it is attitudinal and evaluative in nature and comprised of easily and automatically activated cognitive self-schemas (Cash, 2011), there is reason to believe that using implicit cognitive measures may be a more valid way to examine automatic changes in state body dissatisfaction. Explicit, questionnaire measures of body dissatisfaction are subject to demand characteristics and may lack sensitivity to detect state-based changes in body dissatisfaction or to assess attitudes about which the individual is not fully aware (Vartanian, Polivy, & Herman, 2004). In contrast, the use of tasks that measure interference resulting from schema-based conflicts, represented by delayed response times to the pairings of incongruous material, may help to overcome these problems in research on cognitive processes in those with eating and weight concerns (Vitousek & Hollon, 1990). In support of this, in their review of implicit cognition and eating disorders, Vartanian and colleagues (2004) argued that measures of implicit cognition may help to arrive at a more nuanced understanding of the ways in which cognitive processes impact eating behaviours. Their primary suggestion to achieve this goal was that the Implicit Association Test (IAT) should be used in studies of eating behaviour to measure implicit cognitions about the body. As such, the goal of Study 1 is to

develop an IAT for body image (IAT-BI), in order to facilitate measurement of implicit body dissatisfaction in an experimental test of Body Displacement Theory.

The IAT is a standardized measure designed to assess implicit (rather than explicit) attitudes regarding a particular category of information (Greenwald et al., 1998). This instrument was first developed to measure implicit social attitudes such as racial prejudices (Greenwald et al., 1998), and since has been adapted for a wide variety of purposes. The measure provides the respondent with a series of words on a computer screen, and requires the individual to press two different keys in order to classify the words based on pre-assigned categories. Pairings that the individual has implicitly associated (e.g., flower images and pleasant words; insect images and unpleasant words) are expected to have faster response latencies than those that the respondent does not implicitly associate (e.g., insect images and pleasant words), as the latter receives interference as a result of the pairing of implicitly incongruous content (Greenwald et al., 1998).

Associations have been defined in the literature as implicit when attitudes, judgments or actions take place automatically and therefore without the opportunity for the individual to reflect upon their cause (Greenwald et al., 1998). Because the time available to select a response during each trial on the IAT is extremely short and therefore does not permit deliberation over one's response, the authors have argued that automatic/implicit cognitive processing, rather than deliberate or intentional decision making, is employed (Greenwald et al., 1998). Moreover, embedded in this definition of implicit associations is that explicit awareness of an implicit association is not required for the association to be assessed on an IAT. Following from this, schematic congruency is essential to the underlying rationale of the IAT. The IAT is fundamentally premised upon the idea that when two concepts are implicitly associated, or congruent, in an individual's mind, he or she will be faster at categorizing these concepts

together. That is, the authors have argued that the response bias towards one category versus another on the IAT is due primarily to implicit cognitive associations (Greenwald et al., 1998).

For example, in their seminal study introducing the IAT as a measure of implicit racial prejudice, Greenwald and colleagues (1998) found that White Americans exhibited faster reaction times when asked to categorize Black faces and threatening words using the same key, and White faces and non-threatening words together using a second key, than when they were asked to pair Black faces and non-threatening words, and White faces and threatening words, respectively. As can be expected, given the social unacceptability of explicitly expressed racism, the participants did not endorse prejudicial attitudes on explicit self-report measures. The authors have explained that because it is socially undesirable to exhibit explicit racism, but that implicit systemic biases continue to exist in society, White individuals may not even be aware that they possess implicit associations between Black individuals and concepts of threat. However, the differences in response latencies indicated congruency between Blackness and threat, demonstrating that these biases may in fact exist on an implicit level (Greenwald et al., 1998). These findings have been interpreted as suggesting that explicit measures may not always be most appropriate for assessing schematic content, particularly if these schemas are sensitive, socially unacceptable, or not directly available to the individual's awareness.

The IAT has been adapted to measure a wide variety of implicit associations, including a number of IATs related to eating and the body. For example, adaptations exist to measure: thin ideal internalization (Ahern, Bennett, & Hetherington, 2008; Ahern & Hetherington, 2006); implicit prejudicial attitudes towards fatness (O'Brian et al., 2007; Schwartz, Vartanian, Nosek, & Brownell, 2006); and associations with palatable foods (Houben, Roefs, & Jansen, 2010; Werrij et al., 2009). Verplanken and Tangelder (2011) used an IAT that they described as

measuring implicit body dissatisfaction, however it is not clear that this is truly the case. Their IAT asked participants to categorize pairings of positive and negative appearance-related words (e.g., healthy, slim, pretty; fat, ugly, unhealthy) with neutral or body words (e.g., cars, hammer, lamps; legs, face, back). Although the study did assess positive and negative associations with body parts, it included words that may not necessarily be considered body image words (e.g., healthy, unhealthy), may not be relevant to women (e.g., handsome), and may not be typically targets of body image distress (e.g., back). In addition, the structure of this IAT indicates that it assessed participants' associations with body parts, but not necessarily *their own* body parts.

Research has indicated that IATs assessing self-relevant schemas (e.g., self-esteem) should include a category of “self” words in order to directly assess congruency between the target category and the self (Farnham, Greenwald, & Banaji, 1999; Vartanian et al., 2004). IATs using the self category have been shown to be sensitive to state changes in restrained and unrestrained eaters. For example, in a recent study used a self-esteem IAT to demonstrate that following a body shape awareness manipulation, restrained eaters experienced decreases in implicit self-esteem whereas unrestrained eaters showed the opposite relationship (Hoffmeister, Teige-Mocigemba, Bleichert, Klauer, & Tuschek-Caffier, 2010). Indeed, the accumulating literature on the use of the IAT to assess self-schemas suggests that a true body image IAT should include self-related words in order to assess congruency between self-schemas and body schemas. However, to our knowledge no existing version has incorporated the “self” as a category of stimuli necessary to assess attitudes towards one's own body as fat or thin.

The single-category IAT (SC-IAT; Karpinski & Steinman, 2006) is one means by which the self category may be effectively used in an IAT. Whereas in the format of the traditional IAT (Greenwald et al., 1998), two categories of targets (e.g., “self” and “other”) and two categories of

attitudes (e.g., positive and negative attributes) are provided, in the SC-IAT, one category of target (e.g., “self”) and two categories of attitudes (e.g., positive and negative attributes) are provided (Karpinski & Steinman, 2006). This permits more direct assessment of the types of associations that are most implicitly congruent for that single target category (i.e., whether “self” and “positive”, or “self” and “negative” are more congruent). This would be a useful way to assess body image, because the single “self” category could be assessed for congruency with both fat-related and thin-related words, to determine the associations that one most readily makes. This may be more pertinent than using the traditional model, as when it comes to body-related attitudes, “self” and “other” may not necessarily be characterized by opposite attitudes. That is, it is possible that one could associate “self” with “fat” words as well as associating “other” people with “fat” words, depending on the nature of her schemas. Karpinski and Steinman (2006) have addressed this by noting that in some cases the associations of interest are not comparative. They created a SC-IAT to assess implicit self-esteem, and noted that evaluative associations of the self using the single self-category are more relevant than the self-other comparisons that the traditional IAT would employ. This logic clearly extends to body image, in which self-other comparisons are not necessarily relevant to the assessment of this construct.

In the current study, the IAT-BI was designed to assess implicit attitudes towards one’s own body. The structure of this test is based on the SC-IAT format (Karpinski & Steinman, 2006), and provides two categories of body-related words (i.e., “negative body” words and “positive body” words) and one target category of self-related words (e.g., me, myself). Pairings that are implicitly congruent for an individual (e.g., between “self” words and “negative body” words) should have faster response latencies than pairs that are implicitly incongruent (e.g.,

“self” words and “positive body” words). Preliminary validation of the measure was undertaken in Study 1 prior to using it in the body displacement study (i.e., Study 2).

Study 1 Hypothesis. It was hypothesized that participants who report greater body dissatisfaction on explicit self-report measures would have faster response latencies to “self” and “negative body” words, and slower response latencies for “self” and “positive body” words on the IAT-BI. That is, it was hypothesized that IAT-BI scores will be have small but significant positive correlations with measures of the following related constructs: body dissatisfaction (as measured by the Body Shape Questionnaire; Cooper, Taylor, Cooper & Fairburn, 1987); objectified body consciousness (Objectified Body Consciousness Scale; McKinley & Hyde, 1996); social physique anxiety (Social Physique Anxiety Scale; Hart, Leary, & Rejeski, 1989); and restrained eating (Revised Restraint Scale; Herman, Polivy, & Warsh, 1978). High correlations between the IAT and other measures are not expected, because from a theoretical standpoint, implicit and explicit expressions of a construct are related but not identical, meaning that correlations should be observed but their coefficients should not be large. This is consistent with findings obtained in source literature on the IAT (i.e., Greenwald et al., 1998; Karpinski & Steinman, 2006). Finally, because the IAT is intended to measure implicit cognitive processing and therefore should not be subject to demand characteristics, scores should be unrelated to measures of social desirability (as measured by the Marlow-Crowne Social Desirability Scale; Crowne & Marlow, 1960).

Study 2: An Experimental Induction of Body Displacement

The goal of Study 2 was to experimentally test Body Displacement Theory using an ineffectiveness induction by asking participants in the experimental group to complete a series of unsolvable anagram word puzzles. The use of unsolvable puzzles as an experimental

manipulation is a common and frequently used method in social psychology research (e.g., Baumeister, 1999; Kruglanski & Higgins, 2007). Because participants were blind to the fact that the puzzles were unsolvable, it was expected that their inability to complete this task would induce feelings of ineffectiveness. Individuals in a control condition completed solvable puzzles.

Study 2 Hypotheses. Consistent with Body Displacement Theory, it was hypothesized that restrained eaters in the ineffectiveness induction condition, but not the control condition, would respond to the task with elevated scores on implicit measures of body dissatisfaction. It was hypothesized unrestrained eaters would show no differences in body dissatisfaction between conditions.

Study 1: Development and Validation of IAT-BI

Method

Development of IAT-BI

Structure and word selection. The IAT-BI was programmed and administered using E-Prime software, and modeled after the SC-IAT (Karpinski & Steinman, 2006). The single category of target words was selected to be the “self” category. Self words included the following: me; myself; I; individual’s first name; individual’s last name. Two categories of attitudinal words were used: “negative” body words and “positive” body words. The categories were chosen to reflect common and well-known positive and negative societal attitudes related to body attributes. The words used were derived from the following sources: language used in existing measures of body image; consultation with colleagues in the eating disorders and body image fields; and from thin and fat word lists (matched in syllables, length, frequency, and familiarity) constructed specifically for use in cognitive tasks in eating disorder research (Cassin & von Ranson, 2005). See Appendix A for word lists.

Format. The IAT-BI consists of two main “blocks” (i.e., sets of response trials). On one block, participants view an instruction screen that instructs them to use the “z” key on the keyboard to classify both “self” words and “positive body” words as they appear on the screen, and the “2” key located on the right hand number pad to classify only “negative body” words (Positive Block). On the second block of trials, participants see a second instruction screen that indicates they should now use the “z” key to classify only “positive” body words and the “2” key located on the right hand number pad to classify both “self” words and “negative” body words (Negative Block). See Appendix B for the instructional text. The order of presentation of the two blocks was counterbalanced to control for order effects, and administration of words within each block was randomized.

Each IAT block consists of 43 practice trials (their latencies are not included in the calculation of the IAT score), and 86 actual trials, with no obvious differentiation or separation between the end of the practice and beginning of the actual trials. This use of practice trials allows the participant to habituate to the nature of the task before their response latencies begin to be recorded. The use of practice trials in this format is standard practice in studies that use the IAT (Greenwald et al., 1998; Karpinski & Steinman, 2006). During each block, the words appear on the screen one at a time and participants classify the words using the pre-assigned key instructions. Following each response, respondents are provided with visual feedback about the accuracy of their responses: correct classifications are followed by the brief appearance of a green circle; incorrect classifications are followed by the brief appearance of a red X. Trials that are not responded to within 1500 milliseconds (ms) are followed by the visual appearance of text reading “Please respond more quickly.” See Figures 1 to 2 for sample images of the computer screen during the IAT task.

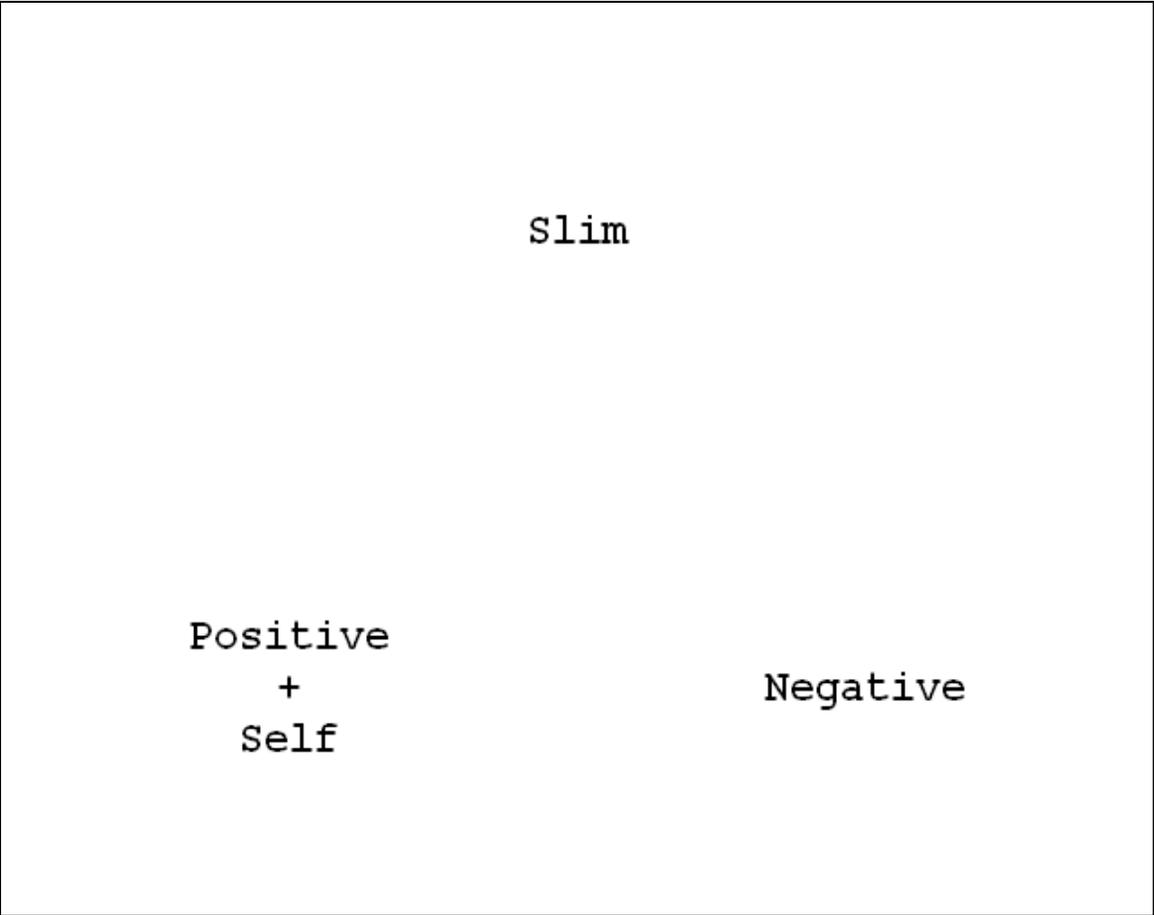


Figure 1. Screenshot of IAT-BI during the Positive Block.

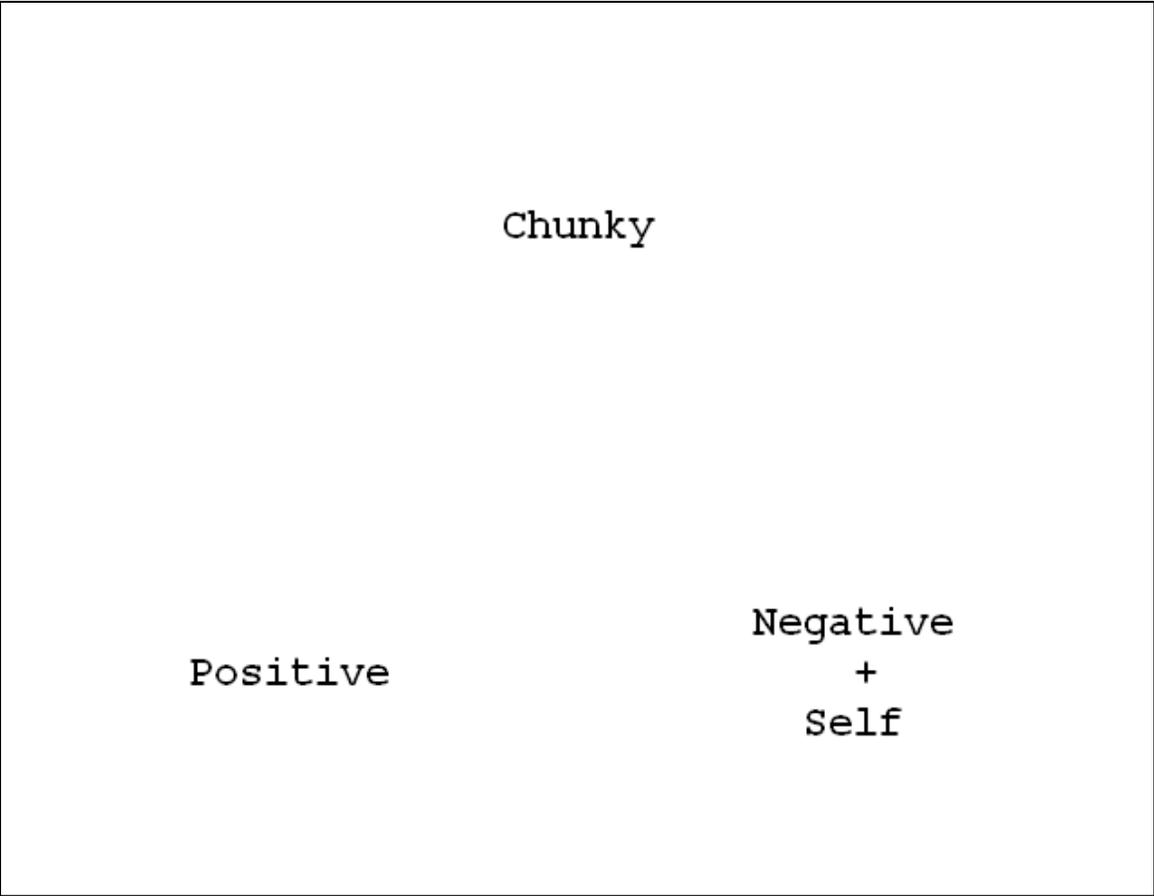


Figure 2. Screenshot of IAT-BI during the Negative Block.

Participants

Participants were 95 female ($N = 75$) and male ($N = 19$) undergraduate students from Ryerson University who were recruited from the undergraduate participant pool and who participated in exchange for partial course credit (1%) in an introductory psychology course.

Materials

Body Shape Questionnaire (BSQ). The BSQ is a 34-item questionnaire that assesses body dissatisfaction over the past 4 weeks (Cooper et al., 1987). Items include assessments of dissatisfaction with weight and shape, preoccupation with weight and shape, body avoidance, and feeling fat. Example items include “Have you been afraid that you might become fat (or fatter)?” and “Has worry about your shape made you diet?”. Respondents are asked to indicate on a 6-point Likert scale ranging from “never” to “always” the frequency to which each question applies to them. BSQ scores are obtained by summing the item responses, and can range from 34 to 204. The BSQ has been reported to have strong test retest reliability ($r = .88$; Rosen, Jones, Ramirez, & Waxman, 1996) and high internal consistency ($\alpha = .97$; Pook, Tuschen-Caffier, & Brahler, 2008). Internal consistency in the present sample was $\alpha = .98$. Concurrent validity has been provided by significant correlations between BSQ scores and Eating Attitudes Test scores and Eating Disorder Inventory Body Dissatisfaction subscale scores in both BN patients and non-clinical women (Cooper et al., 1987). Known-groups validity has also been provided by showing that BSQ scores can successfully differentiate between women with BN and women without eating disorders, as well as between non-clinical weight-concerned dieters and unconcerned non-dieters (Cooper et al., 1987).

Marlow-Crowne Social Desirability Scale (SDS). The SDS is a 33-item questionnaire that assesses whether an individual’s response pattern indicates a biased positive self-

presentation (“faking good”; Crowne & Marlowe, 1960). The scale consists of a series of true-false statements that are culturally sanctioned (i.e., non-pathological), but to which a certain response would be highly improbable. For example, SDS items include “I have never intensely disliked anyone” and “I like to gossip sometimes.” Endorsement of these items in a particular way may indicate that an individual’s characteristic response set is biased towards a socially desirable self-presentation. The SDS has high internal consistency ($\alpha = .88$) and test-retest reliability ($r = .89$). Internal consistency in the present sample was $\alpha = .79$. Validity for the SDS has been demonstrated by a moderate correlation to the Edwards Social Desirability Scale, and the ability of the SDS to significantly discriminate between high and low scorers on the Edwards inventory (Crowne & Marlowe, 1960). The SDS also has demonstrated significant correlations with the MMPI Lie Scale, Validity Scale, and Test-Taking Attitude (response set) Scale (Crowne & Marlowe, 1960).

Objectified Body Consciousness Scale (OBCS). The OBCS is a 24-item scale that measures objectified body consciousness, the degree to which women experience their own bodies from the perspective of an outside observer – that is, as an object to be viewed (McKinley & Hyde, 1996). The OBCS consists of three subscales. The Body Surveillance subscale measures the frequency with which a woman examines her body and thinks of it in terms of how it looks rather than feels. The Body Shame subscale assesses negative emotions in response to failure to achieve cultural standards for beauty and thinness. Finally, the Control Beliefs subscale assesses the degree to which women believe that they can control their appearance and weight through hard work. Sample items from the Surveillance, Body Shame and Control Beliefs subscales are as follows, respectively: “I often worry about whether the clothes I am wearing make me look good”; “When I can’t control my weight, I feel like something must be wrong

with me”; and “I think a person can look pretty much how they want to if they are willing to work at it.” Participants respond to the items on a 7-point Likert scale, and subscale scores are obtained by summing the items (with reverse-keyed items being scored in the opposite direction). OBCS total scores can range from 24 to 168. The OBCS subscales have been shown to have adequate internal consistencies ($\alpha = .68$ to $\alpha = .89$ on the three subscales), good test-retest reliabilities ($r = .73$ to $r = .79$), and all three subscales are moderately correlated with one another. Internal consistency in the present sample was $\alpha = .83$. In addition, construct validity has been demonstrated by significant negative correlations between the subscales and a variety of measures assessing various dimensions of body image, as well as the ability for the Control Beliefs subscale to differentiate dieters and non-dieters.

Revised Restraint Scale (RS). (Herman et al., 1978). The RS is a 10-item questionnaire that assesses restrained eating (dieting). The RS has two subscales: Concern for Dieting and Weight Fluctuation. Sample items include: “How often are you dieting?” and “Would a weight gain of 5 pounds affect the way you live your life?” Five items are scored on a 5-point Likert scale with scores ranging from 0 to 4, and the other five items are scored on a 4-point Likert scale with scores ranging from 0-3. As such, RS scores can range from 0 to 32. Scores of 15 have typically been used in the literature as a cut-off denoting trait restraint (chronic dieting) (e.g., Herman & Polivy, 1980; Polivy, Heatherton, & Herman, 1988). In a non-obese, non-clinical sample, the internal consistency of the RS has been reported as $\alpha = .86$, and factor analysis has confirmed the differentiation between the Concern for Dieting and Weight Fluctuation subscales (Ruderman, 1983). Internal consistency in the present sample was $\alpha = .85$. Construct validity of the RS has been demonstrated by significant correlations with other measures of restrained eating (Laessle, Tuschl, Kotthaus, & Pirke, 1989).

Social Physique Anxiety Scale (SPAS). The SPAS is a 12-item questionnaire that assesses anxiety in response to others' observation or evaluation of one's body (Hart et al., 1989). This construct is related to body dissatisfaction in that many people who are body dissatisfied become highly anxious in situations in which their bodies are likely to be displayed to or scrutinized by others. Sample questions include "In the presence of others, I feel apprehensive about my physique/figure" and "It would make me uncomfortable to know others were evaluating my physique/figure." Respondents indicate on a 5-point Likert scale the degree to which each statement applies to them, from "not at all" to "extremely characteristic". SPAS scores are obtained by summing the responses to each item (with reverse-keyed items being scored in the opposite direction), and scores can range from 12 to 60. The SPAS has strong internal consistency ($\alpha = .90$) and test-retest reliability ($r = .82$). Internal consistency in the present sample was $\alpha = .93$. Construct validity has been demonstrated by moderate correlations with public self-consciousness and measures of body image, and criterion related validity has been shown by relationships between SPAS scores and reported anxiety during a physique evaluation.

Demographic Questionnaire – Study 1 (DQ1). The DQ1 is a brief questionnaire developed for this study that asks respondents to indicate a number of demographic characteristics, including their gender, age, ethnic background, and self-reported height and current weight. See Appendix C for the DQ1.

IAT-BI. The IAT-BI, developed in this study and described in detail previously, was administered as described above using a desktop computer on E-Prime software.

Procedure

Participants were tested in the Health and Sport Psychology Laboratory at Ryerson University in individual one-hour sessions. They began by electronically providing informed consent (see Appendix D for the Informed Consent form). Following the informed consent procedure, participants electronically completed the BSQ, SDS, OBCS, RS and SPAS. The questionnaires were administered in a randomized order and were followed by the DQ1. Informed consent and all questionnaires were administered electronically using Medialab software. Next, participants completed the IAT-BI, which was administered using E-Prime software. Instructions for the IAT-BI were read by the participant and explained verbally by the experimenter, and participants were given the opportunity to ask questions before beginning. The IAT-BI blocks were administered in a counterbalanced order (i.e., some participants received the Positive Block first, and others received the Negative Block first), and the words were presented in a randomized order. Following completion of the IAT-BI, all participants were debriefed verbally and in writing, and were given an opportunity to ask any questions that they may have had (See Appendix E for Debrief form).

Data Analyses

IAT-BI data reduction and scoring. The IAT-BI data were reduced and scored for each individual respondent according to the procedure outlined for the SC-IAT (Karpinski & Steinman, 2006), which is based on the updated *D*-score (i.e., difference score) algorithm published by Greenwald, Nosek and Banaji (2003). For the resulting scores, higher IAT-BI values indicate a bias towards negative associations between the self and the body. As such, lower scores are indicative of bias towards positive associations between the self and the body.

As per the procedure outlined for the SC-IAT, data from the practice trials for each block were discarded as “true practice”. “Blocks” refer to the collective set of response trials keyed in a particular way: The Negative block refers to the collective set of trials in which negative body words and self words were paired together, and the Positive block refers similarly to the collective set of trials in which positive body words and self words were paired together. In both blocks, response latencies faster than 350 ms were discarded, as were non-response trials. Error responses – responses in which the incorrect key was pressed and therefore the incorrect classification was made – were replaced with the block mean plus an error penalty of 400 ms. The average response latency for the Negative Block was subtracted from the average latency of the Positive Block, and this difference score was divided by the pooled standard deviation of all correct response latencies within both Negative and Positive blocks. As such, IAT-BI *D* scores signify associations between concepts of self and concepts of the body, with higher scores biased towards more negative associations.

Internal consistency for the IAT-BI was computed using the method described by Karpinski and Steinman (2006): dividing the trials for each block into equal parts; computing difference scores for each part; and calculating Cronbach’s alpha on the two parts using a Spearman-Brown correction to correct for the underestimation of reliability that results from the division of the task into parts. Cronbach’s alpha was moderate, $\alpha = .64$. Split-half reliability was computed from the correlation between the two halves and was found to be moderate but significant, $r = .47, p < .001$.

Power analysis. A power analysis was conducted using G*Power 3.1 software to determine the sample size required for the correlational analyses to obtain significant effects, should they exist. The source literature on the IAT (Greenwald et al., 1998) and SC-IAT

(Karpinski and Steinman, 2006) have consistently reported low to moderate (but statistically significant) correlations ($r \sim .3$) between the IAT and explicit measures. As such, the power analysis was conducted using a correlation coefficient of $r = .3$, an error probability of $\alpha = .05$, and a power of $1-\beta = .80$. Using these parameters, the power analysis determined that should an actual effect exist, a minimum of 84 participants would be required to detect the effect.

Results

Descriptive Statistics

Participants ($N = 95$) were 78.9% female, ranged in age from 18 to 42 years, and were ethnically diverse. BMI, a standardized index of weight controlled for height, was calculated from self-reported weight and height data using the following formula: $BMI = (703 * \text{Weight}[\text{pounds}] / \text{Height}[\text{inches}]^2)$. Participants ranged in BMI from 15.1 to 35.4. See Table 1 for means and frequencies of demographic variables. See Table 2 for descriptive statistics of the various measures used in the study.

Data Cleaning

Data cleaning was undertaken to examine the study variables for violations of distributional normality and the presence of univariate outliers. Z scores of statistical indicators of skewness and kurtosis were computed ($z_{\text{skew}} = [\text{skew} - 0] / SE_{\text{skew}}$; $z_{\text{kurtosis}} = [\text{kurtosis} - 0] / SE_{\text{kurtosis}}$; Field, 2009) and an alpha level of $p < .001$ (i.e., $z_{\text{skew}} > 3.29$; $z_{\text{kurtosis}} > 3.29$) was used as a criterion for significance, as recommended by Tabachnick and Fidell (2001) for the evaluation of normality in moderate-sized samples. In addition, graphical representations were examined as additional indicators of normality. Finally, univariate outliers were defined as data points with an absolute value exceeding three standard deviations from the mean (i.e., $z = +/-3.29$; Tabachnick & Fidell, 2001).

Table 1

Study 1 Demographic Characteristics

Characteristic	(N = 95)
Age	20.8 (3.6)
BMI	22.3 (3.9)
Ethnicity (%)	
Arab/ West Asian	3.2
Black	8.4
East Asian	13.7
Latin American	1.1
South Asian	11.6
Southeast Asian	4.2
White	40.0
West Indian	2.1
Biracial/Mixed Race	13.7
Other	1.1
Missing Data	1.1

Table 2

Means, Standard Deviations and Minimum and Maximum Scores for Study Variables

Variable	<i>N</i>	Mean (SD)	Minimum Score	Maximum Score
IAT-BI	95	-0.22 (0.35)	-1.12	0.59
BSQ	94	86.33 (38.36)	34.00	195.00
OBCS - Total	95	102.91 (18.91)	62.00	156.00
OBCS – Surveillance	95	37.66 (9.07)	14.00	55.00
OBCS – Body Shame	95	27.33 (10.78)	8.00	56.00
OBCS – Control	95	37.92 (7.57)	19.00	54.00
Beliefs				
RS	94	12.97 (7.22)	0.00	33.00
SDS	92	14.87 (5.38)	2.00	29.00
SPAS	94	36.39 (10.70)	16.00	59.00

Examination of the statistical indicators of normality for IAT scores and total scores for BSQ, OBCS (and its subscales), RS, SDS, and SPAS revealed non-significant skewness and kurtosis statistics, and no outliers. Examination of histograms corroborated these indicators, with distributions that visually adhered relatively well to normality.

Examination of BMI scores for revealed problems with positive skew ($z_{\text{skew}} = 3.68, p < .001$), but not kurtosis. This was supported by inspection of the histogram, which revealed a positively skewed distribution. The BMI data had one outlier ($z = 3.35$). Removal of this outlier resulted in improvement to the normality of the distribution with both skewness and kurtosis values within an appropriate range, and no additional outliers.

Correlational Analyses

Pearson's correlations were computed between the study variables to examine the relationship between IAT-BI scores and related and unrelated constructs. As recommended by Karpinski and Steinman (2006), respondents with IAT-BI error rates exceeding 20% were excluded from the analyses, as such inflated error rates are indicative of biased responding and can negatively impact results. This resulted in 12 participants being excluded from the IAT-BI correlational analyses. There were no differences between those with error rates greater than or less than 20% on any of the study variables, except that those with high errors were significantly older ($p = .008$) and had higher SDS scores ($p = .008$).

As predicted, IAT-BI scores were significantly correlated with BSQ ($r = .23, p < .05$) and OBCS Body Shame subscale ($r = .25, p < .05$), and in addition, the correlation between RS and IAT-BI scores approached significance ($r = .22, p = .05$). Also as predicted, IAT-BI scores were not correlated with SDS scores ($p > .05$). Finally, correlations were not significant between IAT-

BI scores and: OBCS total, surveillance, and control; SPAS; and BMI. Correlation coefficients between study variables can be found in Table 3.

Discussion

Study 1 developed and validated an IAT for body image based on Karpinski and Steinman's (2006) single category IAT. Higher IAT-BI scores were hypothesized to be indicative of greater congruence between "self" concepts and "negative body" concepts – that is, greater body dissatisfaction. Consistent with predictions, the IAT-BI scores were positively correlated with body dissatisfaction, body shame, and restrained eating in an undergraduate sample. These findings indicate that individuals who reported greater body dissatisfaction, body shame, and higher restraint, were more likely to exhibit higher IAT-BI scores.

The relationship between IAT-BI and body dissatisfaction is relatively straightforward, as the former measure was constructed with the intention of assessing implicit body dissatisfaction. However, the relationship to body shame is particularly important, given the intended eventual use of the IAT-BI to assess feeling fat. Silberstein and colleagues (1987) have discussed feeling fat as an experience that is particularly potent at eliciting shame in women. They have explained that in a state of shame, one feels humiliated about her inability to measure up to internalized standards, and as such, her entire self becomes the object of her own disparagement and scorn. Moreover, they have pointed out that feelings of shame are often reflected in body gestures that serve to make oneself smaller, which is interesting given that body shame is related to women's desire to make their "too-big" bodies smaller (Silberstein et al., 1987). As such, the relationship between IAT-BI scores, which assesses whether individuals associate themselves with socially revered or socially derogated bodily attributes, and body shame, makes sense. Individuals who associate themselves with the "negative body" category may be more likely to feel ashamed

Table 3

Correlations between Study 1 Variables

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. IAT-BI	1.00	.23*	.17	.11	.25*	-.06	.22 ^a	-.02	.15	-.06
2. BSQ		1.00	.72**	.58**	.73**	.04	.78**	.02	.85**	.40**
3. OBCS – Total			1.00	.78**	.82**	.37**	.65**	-.17	.66**	.26*
4. OBCS – Surveillance				1.00	.53**	-.03	.46**	-.32**	.57**	.19
5. OBCS – Shame					1.00	-.05	.67**	-.09	.69**	.31**
6. OBCS – Control						1.00	.10	.09	-.03	-.02
7. RS							1.00	-.11	.74**	.46**
8. SDS								1.00	-.07	.02
9. SPAS									1.00	.40**
10. BMI										1.00

^a $p = .05$.* $p < .05$ ** $p < .001$

about their bodies. In addition, the relationship between IAT-BI scores and restraint can also be explained by similar logic – these same authors have discussed that dieting is the logical and often primary means by which women deal with the “shame of fatness” (Silberstein et al., 1987, p. 97).

It should be noted that although significant, the correlations obtained were only small to moderate in magnitude – within the range of $r = .22$ to $r = .25$. This is indeed consistent with the correlations between implicit and explicit measures reported in past literature (e.g., Greenwald et al., 1998; Karpinski & Steinman, 2006). The theory underlying the IAT suggests that some parts of cognitive processing are automatic or otherwise unavailable to awareness, and thereby may not be reflected in explicit, self-report measures. As such, implicit and explicit measures of the same construct should be significantly but not highly correlated: High correlations would indicate that the measures are assessing the same construct, and the rationale underlying the measurement of implicit cognition suggests that this is not the case. As such, the present findings indeed provide convergent validity of the IAT-BI as a measure of implicit body dissatisfaction.

Contrary to hypotheses, the IAT-BI scores were not correlated with body surveillance, control beliefs, and social physique anxiety. However, these constructs are related to but not directly measuring body dissatisfaction. For example, the OBCS Surveillance subscale measures the degree to which one thinks of her body in terms of how it looks. In retrospect, although body dissatisfied individuals may be more likely to endorse body surveillance, the construct itself is distinct from body dissatisfaction. It may be that these constructs are related to explicit body dissatisfaction (as indicated by the significant correlations between BSQ, OBCS Surveillance, and SPAS) but not implicit body dissatisfaction. That is, it may be that some individuals do not

endorse some of these related measures, but nevertheless do endorse implicit body dissatisfied cognitions.

Consistent with hypotheses, IAT-BI scores were not correlated with SDS scores. These findings indicate that scores on the IAT-BI are not a result of socially desirable responding. This is expected, given that IAT-BI scores are meant to assess automatic cognitions and should not be subject to demand characteristics. As such, these findings provide some evidence of discriminant validity of the IAT-BI. It is noted that participants with exceptionally high error rates did in fact have significantly higher SDS scores compared to those with lower error rates. These findings suggest that perhaps individuals who are motivated towards socially desirable responding may attempt to convey a biased self-presentation on the IAT-BI, but because of its assessment of automatic rather than deliberate responding, a high rate of erroneous responding results. Indeed it is noted that including these participants in the correlation between IAT-BI scores and SDS scores did not result in a correlation between these variables, suggesting in fact that the IAT-BI is not in fact related to socially desirable responding.

The collective findings of Study 1 provide support for the psychometric properties, including reliability and construct validity, of the IAT-BI as a measure of implicit body dissatisfaction in undergraduate students. These results indicate that the IAT-BI measures the congruency of self concepts and negative body concepts. This suggests that the IAT-BI can be used as a measure of implicit body dissatisfaction in studies that require measurement of this construct.

Study 2: Experimental Investigation of Body Displacement Theory

Method

Participants

Participants were 83 female undergraduates from Ryerson University who were recruited from the undergraduate participant pool and who participated in exchange for partial course credit (1%) in an introductory psychology course.

Materials

Unsolvable and solvable anagram tasks. The unsolvable anagram task is a series of nine anagram word puzzles that cannot be solved to form any existing English words, and one solvable puzzle. This task was used in the experimental manipulation condition to induce feelings of ineffectiveness. The solvable anagram task is a series of 10 simple anagram word puzzles that should be easily solved to form common English words. This task was used in the control condition. The unsolvable and solvable anagram puzzles (see Appendix F and G, respectively) were derived from previous research that has used anagram puzzles as an experimental induction (Taylor, 2003; Toburen & Meier, 2010).

Mood States Scale. In order to verify that the manipulation successfully induced state feelings of ineffectiveness, a visual analog scale disguised as a “baseline mood state” questionnaire was constructed to administer immediately following the manipulation. This measure consists of 10 items, each of which electronically presents respondents with a 5 inch line, anchored by opposing mood states (e.g., “effective” and “ineffective”; “successful” and “unsuccessful”; see Appendix H). Respondents use an electronic slider to mark the place on the line that best represents their current state on each continuum. The “effective-ineffective” item (“MSS-Ineffective”) was used to compare participants in the two conditions in order verify that

the ineffectiveness manipulation was successful. A second item, “fat-not fat” (“MSS-Fat”) was used to examine feelings of fatness in the present moment.

IAT-BI. The IAT-BI, as described in Study 1, was administered as a measure of implicit body dissatisfaction. Internal consistency and split-half reliability for the present sample were computed using the method described by Karpinski and Steinman (2006) and described in detail in Study 1. Cronbach’s alpha was adequate, $\alpha = .79$. Split-half reliability was moderate but significant, $r = .65$, $p < .001$.

Body Shape Questionnaire (BSQ). See the Study 1 methodology for a detailed description of the BSQ (Cooper et al., 1987). Cronbach’s alpha for the present sample was strong, $\alpha = .97$.

Body Image States Scale (BISS). The BISS is a 6-item measure of state body dissatisfaction that assesses affective and evaluative responses to one’s body in the present moment, using a 9-point Likert scale (Cash, Fleming, Alindogan, Steadman, & Whitehead, 2002). All items begin with the stem “Right now I feel ...”, followed by nine degrees of the same domain, for example “Extremely satisfied with my body size and shape” to “Extremely dissatisfied with my body size and shape”. The BISS is scored by averaging the six items, with reverse-keyed items scored in the opposite direction. Higher scores indicate more positive body image states. Test-retest reliability was relatively low ($r = .69$ in women), which reflects its nature as a state measure, indicating that responses over time should not be expected to be stable. The BISS has adequate internal consistency ($\alpha = .77$ to $\alpha = .90$ in women), and Cronbach’s alpha for the present sample was good, $\alpha = .87$. Concurrent validity has been demonstrated by significant correlations with a range of measures related to body image and related constructs.

BISS scores are also sensitive to changes in the affective valence of the situations, and can differentiate women and men in their responses to negative situations.

Eating Disorder Examination Questionnaire (EDE-Q). The EDE-Q is 36-item questionnaire designed to detect the presence of an eating disorder by assessing key cognitive and behavioural features over the past 28 days (Fairburn & Beglin, 1994). It is a questionnaire version of the Eating Disorder Examination interview (Fairburn & Cooper, 1993), which is considered to be the gold standard in the assessment of eating disorders. The EDE-Q has four subscales: Restrained Eating; Eating Concerns; Weight Concerns; and Shape Concerns. It also includes a number of diagnostic items that assess the presence and frequency of eating disorder symptoms such as binge eating and self-induced vomiting. Subscale items are scored on a seven-point Likert scale ranging from “no days” to “every day”, and subscale and total scores are obtained by averaging the item scores for the applicable items. Diagnostic items require the respondent to indicate whether she or he has engaged in each behaviour described (e.g., vomiting to lose weight), as well as the number of times each behaviour has occurred during the previous 28 days. Validity of the EDE-Q has been demonstrated with significant agreement on frequency of binge eating, self-induced vomiting, laxative abuse, and the subscales, with those reported on the clinician-administered EDE interview, in both community samples and eating disorder patient samples. However it should be noted that despite significant agreement, higher binge eating rates were reported on the EDE-Q than the EDE interview in both clinical and non-clinical samples (Fairburn & Beglin, 1994), indicating that the EDE-Q may result in overreporting of binge eating symptoms. Cronbach’s alpha for the four subscales in the present sample was strong, $\alpha = .96$.

Eating Disorder Inventory (EDI). The EDI is a commonly used 64-item questionnaire that assesses characteristics related to eating disorder psychopathology (Garner & Olmsted, 1984). The EDI assesses eight subscales: Drive for Thinness; Body Dissatisfaction; Ineffectiveness; Bulimia; Perfectionism; Interpersonal Distrust; Interoceptive Awareness; and Maturity Fears. This study will utilize only the first three subscales, as they are relevant to the study; the latter five are constructs that are less related to the interests of the current study. Each item presents a statement and the respondent rates the degree to which the statement is true on a six-point Likert scale ranging from “always” to “never”. Sample items include: “I am terrified of gaining weight”; “I think that my stomach is too big”; and “I feel ineffective as a person”. Items are scored on a scale from 0 to 3, with the most extreme eating disordered response receiving a score of 3, the adjacent responses receiving scores of 2 and 1, respectively, and the three “non-disordered” responses all receiving scores of 0. Subscale scores are obtained by summing the item scores within each subscale. Internal consistencies for the subscales have been reported for women with AN ($\alpha = .82$ to $\alpha = .90$) and female controls ($\alpha = .65$ to $\alpha = .91$). Cronbach’s alphas for the subscales of interest in the present sample were appropriate: Drive for Thinness, $\alpha = .90$; Body Dissatisfaction, $\alpha = .89$; and Ineffectiveness, $\alpha = .86$. Validity has been demonstrated by showing that AN patients who binge and purge score higher on the Bulimia and Body Dissatisfaction subscales than restricting AN patients (Garner et al., 1983). Additionally, obese respondents scored higher than formerly obese respondents on Body Dissatisfaction, and higher than female controls on Bulimia and Drive for Thinness. Finally, subscales correlate as expected with measures of restrained eating, body dissatisfaction, disordered eating attitudes, and other related measures.

Revised Restraint Scale (RS). See the Study 1 methodology for a detailed description of the RS (Polivy et al., 1978). Cronbach's alpha for the present sample was adequate, $\alpha = .81$.

Word Stem Completion Task (WSCT). The WSCT is a 20-item measure of implicit appearance-related processing. It provides the respondent with a series of three-letter "word stems", which the respondent is instructed to complete with whichever word comes to his or her mind first (Tiggemann, Hargreaves, Polivy, & McFarlane, 2004). All word stems can be completed with either an appearance or non-appearance word. In all cases, the non-appearance words have a higher frequency in the English language than the appearance words, and as a result, the authors have explained that individuals who tend to complete the word stems with appearance words are experiencing appearance- and weight-schema activation. For example, "SLE" could be completed as "Slender" (frequency of 33 per million) or "Sleep" (100+ per million). The WSCT is scored by categorizing each response as either an appearance or non-appearance word and then summing the total number of appearance words that the respondent has generated. Perfect interrater agreement was reported for 11 of the word stems, 98.3% agreement for 7 of the word stems, and agreement over 93% for the remaining word stems, in a sample of 60 respondents with a total of 1200 completed word stems. Construct validity was demonstrated by showing that the WSCT is responsive to a variety of experimental manipulations, such as: exposure to appearance or non-appearance related commercials; exposure to appearance or non-appearance related music videos; and completion before or after being primed with appearance-related schemas. Additionally, male respondents generate fewer appearance-related words compared to female respondents. Cronbach's alpha for the present sample was moderate, $\alpha = .59$.

Demographic Questionnaire – Study 2 (DQ2). The DQ2 is a seven-item questionnaire that asks participants to indicate demographic characteristics such as their age, gender, sexual orientation and ethnicity. See Appendix I for the DQ2.

Procedure

Participants were recruited under the guise of “individual differences in cognitive performance, reaction time, and health-related variables in women.” This minor deception was intended to reduce demand characteristics that may occur if the true purpose of the study was known in advance of the manipulation. Participants were tested individually in the Health and Sport Psychology Laboratory at Ryerson University during individual one-hour sessions.

Upon entry into the study, the researcher explained that the study was looking at cognitive performance and reaction time variables as they relate to health factors, and the procedures of the study were briefly outlined. Participants then provided written consent to participate (see Appendix J for the informed consent form).

After providing informed consent, participants were randomly assigned to one of two conditions. In the Ineffectiveness Condition, participants were asked to complete the unsolvable anagram task described previously. In the Control condition, participants were asked to complete the solvable anagram task described above. In both cases, participants were told the following: “The first part of the study is a puzzle task. The puzzle consists of ten scrambled word puzzles, and your task is to unscramble them. I will give you 7 minutes to complete the puzzles. Most people can finish these puzzles in about 7 minutes.” Participants were provided with the puzzles and a pen, and left for 7 minutes to complete the puzzles. After 7 minutes, the researcher indicated that the time had elapsed, and that they would be moving onto the next part of the study.

Next, the participants completed the MSS (manipulation check), followed by the WSCT. Following this, participants completed the IAT-BI, which was described to them as a reaction time task. The IAT-BI was administered in an identical manner to that described in Study 1. Following the IAT-BI, the participants completed the remaining questionnaires. The BISS and BSQ were always presented first and second, as body dissatisfaction was a primary construct of interest and therefore the explicit state and trait measures of this construct were assessed first to directly follow the implicit measures. Following this, the measures assessing eating and related constructs – the EDE-Q, EDI, and RS – were administered in a randomized order, followed by the DQ2, which was presented last.

After completion of the questionnaires, the researcher obtained objective measurements of height and weight in the laboratory. Participants were asked to remove their shoes and stand against a tape measure on the wall, where the researcher recorded height in inches, to the nearest quarter inch. Then participants were asked to step on an analog scale, where the researcher recorded weight in pounds, to the nearest half pound.

Following this, participants were debriefed verbally and in writing (See Appendix K for the debrief form). The Body Displacement Theory was explained in lay terms, and the study was described as a way to test this theory by identifying whether feelings of ineffectiveness lead to changes in how participants feel about their bodies. The anagrams were disclosed as unsolvable for those in the Ineffectiveness Condition, and the nature and rationale for the deception was explained. Participants were given the opportunity to ask questions and express concerns. All participants were provided the information for the Ryerson University Student Counselling Center.

Data Analysis

IAT-BI data reduction and scoring. The IAT-BI data were reduced and scored for each individual respondent using an identical procedure to that reported for Study 1.

Power analysis. A power analysis was conducted using G*Power 3.1 software to determine the sample size required for the between-groups comparisons to obtain significant effects, should they exist. The only body displacement study to find a body displacement effect using an implicit measure (McFarlane et al., 2011) reported a small effect size (partial $\eta^2 = .08$) for the body displacement effect. As such, the power analysis was conducted using an effect size of partial $\eta^2 = .08$, an error probability of $\alpha = .05$, a power of $1 - \beta = .80$, and 4 groups (2x2). Using these parameters, the power analysis determined that should an actual effect exist, a minimum of 93 participants would be required to detect the effect.

Primary analyses. Data were analyzed in SPSS version 19 using a series of between groups analysis of variance (ANOVA) and multivariate analysis of variance (MANOVA), as indicated. Restraint category and experimental condition were entered as between-groups factors, and scale and subscale scores as dependent variables. As recommended by Tabachnick and Fidell (2001), a conservative alpha level ($p < .01$) was used to evaluate significance of Box's test of homogeneity of variance-covariance, because this test is too highly sensitive to divergences from homogeneity when sample sizes are unequal to use conventional criteria.

Results

Descriptive Statistics

Participants ($N = 83$) were female and ranged in age from 17 to 44 years. The sample was ethnically diverse and the majority of participants identified their sexual orientation as heterosexual. BMI was calculated from objectively obtained weight and height data, and

participants ranged in BMI from 17.0 to 40.33. See Table 4 for means and frequencies of demographic characteristics.

Data Cleaning

Data cleaning was undertaken to examine the dependent variables for violations of distributional normality and the presence of outliers. The same criteria used in Study 1 for the evaluation of skewness, kurtosis, and outliers were employed.

Examination of the statistical indicators revealed non-significant skewness and kurtosis statistics and no univariate outliers for: IAT-BI; WSCT; RS; BISS; BSQ; EDI Body Dissatisfaction (EDI-BD); MSS-Ineffective; and MSS-Fat. Examination of histograms corroborated these indicators, with distributions that visually adhered relatively well to normality. Other than the BISS, these variables all also satisfied the assumption of homogeneity of variance.

Despite its adherence to normality, the BISS scores violated the assumption of homogeneity of variance ($p = .01$). Several data transformations were attempted. (i.e., $\ln X$; $1/X$; and $1/(X+1)$) to rectify this but these transformations all yielded distributions that violated normality and did not improve variance. A square root transformation (\sqrt{X}) provided the best improvement to unequal variances (although it was still significant, $p = .03$), and the normality assumption remained tenable. As such, the square root transformed BISS scores were used in subsequent analyses.

Examination of the EDI subscale scores for Drive for Thinness (EDI-DT) revealed problems with positive skew ($z_{\text{skew}} = 4.77, p < .001$), but not kurtosis. This was supported by inspection of the histogram, which revealed a positively skewed distribution. The EDI-DT had no univariate outliers, but given its significantly skewed distribution, as well as heterogeneity of

Table 4

Study 2 Sample Demographic Characteristics

Characteristic	(<i>N</i> = 83)
Age	20.3 (4.9)
BMI	22.3 (4.7)
Ethnicity (%)	
Black	3.6
East Asian	15.7
Latin American	4.8
South Asian	12.0
Southeast Asian	8.4
White	45.8
Biracial/Mixed Race	6.0
Other	2.4
Missing Data	1.2
Sexual Orientation (%)	
Heterosexual	92.8
Bisexual	4.8
Lesbian/Gay	0.0
Other	1.2
Missing Data	1.2

variance ($p < .001$), these data were transformed. Several data transformations were attempted (i.e., $1/X$; $1/(X_{\text{highest score}} - X)$; Field, 2009) to rectify this but these transformations all yielded distributions that continued to violate normality and homogeneity of variance. Finally, a log transformation (i.e., $\log(X + 1)$) was performed, and the resulting distribution had appropriate statistical indicators for both skewness and kurtosis. Heterogeneity of variance persisted but was much improved over the original scores ($p = .04$) and no other transformation improved the variance to this degree. As such, the log transformed distribution of EDI-DT was used in subsequent analyses requiring this variable.

Examination of the EDI subscale scores for Ineffectiveness (EDI-IE) revealed problems with positive skew ($z_{\text{skew}} = 8.59, p < .001$) and leptokurtosis ($z_{\text{kurtosis}} = 12.48, p < .001$), as well as heterogeneity of variance. This was corroborated by visual examination of the histogram, which revealed a positively skewed and leptokurtic distribution. Further examination revealed that the EDI-IE had one outlier ($z = 4.83$). Removal of this outlier improved but did not fully correct the statistical indicators of normality ($z_{\text{skew}} = 6.19, p < .001, z_{\text{kurtosis}} = 4.14, p < .001$), indicating that the distribution was still significantly non-normal. In addition, there was now a new outlier to the data ($z = 3.68$). Removal of the second outlier corrected problems with kurtosis, and revealed no additional outliers, but the distribution was still significantly positively skewed ($z_{\text{skew}} = 5.55, p < .001$). As such, transformation of the distribution was undertaken to correct the positive skewness. A log transformation (i.e., $\log(X + 1)$) was used, and the resultant distribution had appropriate statistical indicators for both skewness and kurtosis. Heterogeneity of variance persisted but was much improved over the original scores ($p = .04$). As such, the log transformed distribution of EDI-IE was used in subsequent analyses requiring this variable.

Restrained Eating Categorization

Scores on the RS ranged from 0 to 28 ($M = 11.2$, $SD = 6.2$), and were used to classify participants into two restraint categories, based on the previously described criterion of scores greater than 15 delineating restraint. Research using the RS has consistently defined restraint as scores exceeding 15, regardless of the mean or median of the specific sample, as early research indicated that categorization using this criterion usefully differentiated between eating groups (e.g., Herman & Polivy, 1980; Polivy et al., 1988; Polivy & Herman, 1991; Polivy, Herman, Heatherton, & Erskine, 1979). Importantly, it is noted that dichotomization of variables is a contentious topic in statistical literature. For example, dichotomization of a continuous variable into categories results in loss of information about individual differences, as well as lowered power and effect sizes (MacCallum, Zhang, Preacher, & Rucker, 2002). Nevertheless, other researchers have argued that dichotomization may be legitimate when categorization is the most common practical use of the variable within the applied field and when the validity of categorization has been established by common usage (DeCoster, Iselin, & Gallucci, 2009). The literature on restrained eating has nearly ubiquitously categorized restraint in this manner, and as such, establishing this as the most common usage of this variable, permitting comparisons to past research, and making the results of categorical analyses useful on a practical level. Using the criterion of 15, 30.1% of the sample was classified as restrained, and 69.9% was classified as unrestrained.

Eating Disorder Symptoms

EDE-Q scores were examined for descriptive purposes to evaluate the proportion of the sample that reported eating disorder symptoms and therefore might represent eating disorder cases. The sample reported means that were slightly higher than the community norms reported

by Fairburn, Cooper and O'Connor (2008) and age-matched (i.e., 18-22) community norms reported by Mond, Hay, Rodgers and Owen (2006), but substantially lower than the means reported for eating disorder cases identified from a community sample using the EDE structured diagnostic interview (Mond, Hay, Rodgers, Owen, & Beumont, 2004). Female undergraduates consistently report higher rates of eating disorder symptoms (e.g., 13.5%; Eisenberg, Hiclett, Roeder, & Kirz, 2011) compared to young women in the community (e.g., 5.3%; Favaro, Ferrara, & Santonastaso, 2003), which likely accounts for the differences in means between the present sample and the reported community norms. See Table 5 for a comparison of EDE-Q subscale means between the present sample, and those of the other reported studies (i.e., Fairburn, Cooper, & O'Connor, 2008; Mond et al., 2004; Mond et al., 2006).

In terms of the EDE-Q diagnostic items, bipolar (yes-no) questions asking about the presence or absence of key eating disorder symptoms did not correspond well to participant reports of frequency of episodes. For example 32.5% of participants responded "yes" to the binge eating item, but 22.9% indicated in the subsequent item that they had engaged in 1 or more binge episodes in the previous 28 days, and even fewer (9.6%) endorsed loss of control over eating during these episodes. Given that loss of control over eating is an important component of binge eating, we can interpret these three items together as indicating that 9.6% of the sample reported binge eating in the 28 days prior to participation. Additionally, 6.0% of the sample endorsed one or more self-induced vomiting episodes, and 2.4% of the sample reported compensatory laxative use in the preceding 28 days. No participants endorsed compensatory diuretic use, and although 47.0% of the sample endorsed exercise in the preceding 28 days, it is unclear the proportion for whom this was compensatory or otherwise disordered.

Table 5

Comparison of Study 2 EDE-Q Scores and Community and Eating Disorder Norms

	Current Study (<i>N</i> = 83)	Fairburn et al., 2008 (<i>N</i> = 241)	Mond et al., 2006 (<i>N</i> = 1186)	Mond et al., 2004 (<i>N</i> = 15)
Type of Sample	Undergraduate sample	Community sample	Community sample (Age 18-22)	ED cases from a community sample ^a
Global Score	1.77 (1.30)	1.55 (1.21)	1.59 (1.32)	3.09 (0.83)
Restraint	1.33 (1.45)	1.25 (1.32)	1.29 (1.41)	2.65 (1.48)
Eating Concern	1.00 (1.22)	0.62 (0.86)	0.87 (1.13)	2.02 (0.95)
Shape Concern	2.48 (1.56)	2.15 (1.60)	2.29 (1.68)	4.01 (0.98)
Weight Concern	1.97 (1.53)	1.59 (1.37)	1.59 (1.32)	3.09 (0.83)

^aCases identified using the EDE diagnostic interview (Fairburn & Cooper, 1993).

Manipulation Check

Participants were compared between restraint groups and experimental condition on the MSS-Ineffective scale, in order to ensure that the experimental manipulation successfully induced ineffectiveness. Between groups ANOVA indicated a main effect of condition, $F(1, 79) = 8.21, p = .005, \eta^2 = .09$, such that participants in the experimental condition reported more ineffectiveness than those in the control condition. There was no main effect for restraint group, $F(1, 79) = 0.31, p = .58$, and no interaction, $F(1, 79) = 0.13, p = .72$, indicating that participants did not differ in their feelings of ineffectiveness depending on their status as restrained or unrestrained eaters. These findings indicate that the ineffectiveness task used as the experimental manipulation in this study was successful at inducing ineffectiveness as intended. See Table 6 for means and standard deviations for the MSS-Ineffective as well as all subsequent between-groups comparisons.

Body Displacement Comparisons

IAT-BI scores. Participants were compared between restraint groups and experimental condition on IAT-BI scores. As indicated by Karpinski and Steinman (2006), respondents with IAT-BI error rates exceeding 20% were excluded from the analyses, as such inflated error rates are indicative of biased responding. This resulted in 12 participants being excluded from the IAT-BI analyses. The excluded participants did not differ from the remainder of the sample on any of the study variables or demographic variables ($p > .05$). Between groups ANOVA indicated no significant interaction between restraint group and condition, $F(1, 67) = 0.32, p = .20$, as well as no significant main effect of restraint, $F(1, 67) = 0.80, p = .37$, or condition, $F(1, 67) = 0.15, p = .70$.

Table 6

Comparison of Study 2 Scale and Subscale Means

Scale	Grand Mean	Restrained		Unrestrained		Levene (<i>p</i>)
		Control	Experimental	Control	Experimental	
BISS ^a	5.27 (1.61)	3.77 (1.85)	5.24 (1.98)	5.38 (1.20)	5.94 (1.35)	.01
BISS-Square Root ^b	1.89 (0.42)	2.25 (0.44)	1.87 (0.54)	1.88 (0.31)	1.71 (0.31)	.03
BSQ	89.10 (33.51)	128.08 (31.79)	111.50 (29.07)	76.53 (26.00)	73.96 (22.16)	ns
EDI-BD	8.38 (7.01)	17.77 (5.33)	8.11 (8.27)	6.50 (4.90)	5.96 (5.84)	ns
EDI-DT ^a	4.84 (5.67)	12.54 (6.67)	8.17 (4.37)	2.71 (3.85)	2.04 (2.63)	< .001
EDI-DT-	0.55 (0.44)	1.06 (0.31)	0.97 (0.20)	0.39 (0.39)	0.35 (0.32)	.04
Log ^c						
EDI-IE ^a	2.75 (3.51)	5.69 (5.30)	3.40 (3.37)	1.85 (2.35)	2.13 (2.98)	< .001
EDI-IE-Log ^c	0.41 (0.37)	0.62 (0.49)	0.49 (0.40)	0.33 (0.32)	0.36 (0.33)	.04
IAT-BI	-0.13 (0.43)	-0.11 (0.42)	-0.30 (0.45)	-0.15 (0.43)	-0.05 (0.43)	ns
MSS-Fat	32.99 (30.50)	67.08 (30.32)	29.50 (31.87)	25.67 (23.61)	25.38 (26.70)	ns
MSS- Ineffective	50.67 (25.31)	43.16 (17.47)	62.08 (29.36)	42.00 (21.29)	56.57 (28.64)	ns
WSCT	3.88 (2.28)	5.23 (1.96)	4.33 (2.35)	3.74 (2.35)	3.13 (2.03)	ns

^aUntransformed scores not used in group comparison analyses due to significant violations of normality but are reported here for completeness.

^bScores are square root transformed (i.e., \sqrt{X}) for group comparisons due to heterogeneity of variance. See Study 2 data cleaning section.

^cScores are log transformed (i.e., $(\log(X + 1))$) for group comparisons due to violations of normality. See Study 2 data cleaning section.

Word Stem Completion Task. Between groups ANOVA was used to compare restraint groups and experimental condition on WSCT scores. There was no significant interaction between restraint group and condition, $F(1, 79) = 0.07, p = .79$, and no significant main effect of condition, $F(1, 79) = 2.02, p = .16$. There was a significant main effect of restraint, $F(1, 79) = 6.50, p = .01, \eta^2 = .08$, indicating that restrained eaters generated significantly more appearance-related words, regardless of experimental condition. It is noted that means for unrestrained eaters were similar to those reported by McFarlane and colleagues (2011), but means for restrained eaters were slightly higher than those previously reported.

Body Image States Scale. Between groups ANOVA was used to compare restraint groups and experimental condition on square root transformed BISS scores. There was no significant interaction between restraint group and condition, $F(1, 79) = 1.29, p = .26$. There was a significant main effect of restraint, $F(1, 79) = 7.98, p = .006, \eta^2 = .09$, indicating that restrained eaters reported significantly more body dissatisfied scores, regardless of experimental condition. There was a significant main effect of condition, $F(1, 79) = 8.53, p = .005, \eta^2 = .10$, but unexpectedly, examination of the raw means indicated greater body dissatisfaction (i.e., lower scores) in the control condition.

MSS-Fat. Between groups ANOVA revealed a significant univariate interaction for the “Not Fat-Fat” scale, $F(1, 75) = 8.01, p = .006, \eta^2 = .10$, as well as significant univariate main effects for restraint group, $F(1, 75) = 12.02, p = .001, \eta^2 = .14$, and condition, $F(1, 75) = 8.31, p = .005, \eta^2 = .10$. In contrast to predictions, however, the means revealed that although the unrestrained group consistently reported feeling less fat in both conditions, the restrained group reported feeling more fat in the *control* condition, but feeling less fat in the *experimental*

condition (see Figure 3). This is indeed consistent with the findings reported for the BISS that indicated greater body dissatisfaction for those in the control condition.

Body Shape Questionnaire. Between groups ANOVA was used to compare restraint groups and experimental condition on BSQ scores. There was no significant interaction between restraint group and condition, $F(1, 78) = 1.20, p = .28$, and no significant main effect of condition, $F(1, 78) = 2.25, p = .14$. There was a significant main effect of restraint, $F(1, 78) = 48.68, p < .001, \eta^2 = .38$, indicating that restrained eaters reported significantly greater body dissatisfaction, regardless of experimental conditions.

Relevant EDI subscales. Between groups MANOVA was used to compare restraint groups and experimental conditions on the following EDI subscales: Body Dissatisfaction; Drive for Thinness (transformed scores); and Ineffectiveness (transformed scores). Box's test of equality of covariance was non-significant, $p > .01$. There was a significant multivariate interaction between condition and restraint group, Wilk's $\lambda = .86, F(3, 73) = 4.11, p = .009, \eta^2 = .14$. There were also significant multivariate main effects of restraint, Wilk's $\lambda = .57, F(3, 73) = 18.17, p < .001, \eta^2 = .43$, and condition, Wilk's $\lambda = .83, F(3, 73) = 4.88, p = .004, \eta^2 = .17$. Examination of univariate effects for EDI-BD revealed a significant univariate interaction, $F(1, 75) = 982, p = .002, \eta^2 = .12$, as well as significant univariate main effects for restraint group, $F(1, 75) = 21.31, p < .001, \eta^2 = .22$, and condition, $F(1, 75) = 8.12, p = .001, \eta^2 = .14$. In contrast to predictions however, means revealed that although the unrestrained group reported lower body dissatisfaction in both conditions, the restrained group reported higher body dissatisfaction in the *control* condition, and lower body dissatisfaction in the *experimental* condition (see Figure 4). There were no significant univariate interactions or main effects of condition for either EDI-IE or EDI-DT (both using log transformed scores). However, there were significant

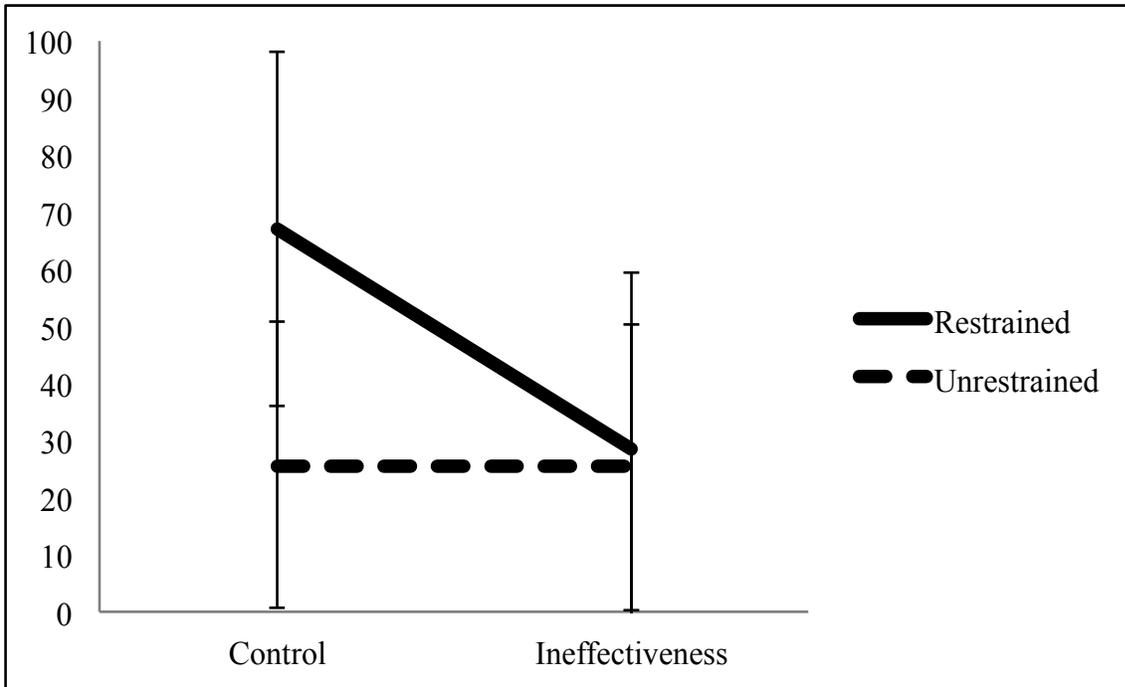


Figure 3. Between-groups ANOVA comparing condition and restraint groups on MSS-Fat scores.



Figure 4. Between-groups ANOVA comparing condition and restraint groups on EDI-BD scores.

univariate effects of restraint for EDI-IE, $F(1, 75) = 4.91, p = .03, \eta^2 = .06$, and EDI-DT, $F(1, 75) = 54.69, p < .001, \eta^2 = .42$. These findings indicate that restrained eaters consistently reported greater feelings of ineffectiveness, and greater drive for thinness, irrespective of experimental condition, a finding that is consistent with the definition of the groups.

Discussion

Study 2 investigated Body Displacement Theory using an experimental paradigm by examining whether restrained eaters would respond to feelings of ineffectiveness with increased implicit body dissatisfaction, implicit appearance-related cognitive processing, and explicit body dissatisfaction. Contrary to the hypotheses, restrained and unrestrained eaters demonstrated no differences in implicit body dissatisfaction or implicit appearance-related processing. Explicit measures revealed even more unexpected findings. Although there was no interaction between eating group and condition for the BISS, BSQ, or EDI Drive for Thinness or Ineffectiveness subscales, interactions in the opposite direction to that predicted were found for both EDI Body Dissatisfaction and MSS-Fat scales. These findings indicated that restrained eaters who felt ineffective reported *less* trait body dissatisfaction on the EDI, and *less* feeling fat on the MSS, compared to restrained eaters in the control condition. Unrestrained eaters were not affected by the manipulation.

There are a number of possible explanations for these mixed and contradictory findings. The first and possibly most parsimonious is that body displacement was not successfully induced in the present study. Although the manipulation check (MSS-ineffectiveness) indicated that participants in the experimental condition did indeed feel *ineffective*, it is possible that feelings of ineffectiveness were not displaced as body-related emotions or mislabelled as feeling fat in the present sample. If indeed body displacement was not successfully induced, it may be that the

induction itself did not effectively tap this construct. It may be that perceptions of oneself as cognitively or intellectually ineffective are less salient than other types of ineffectiveness, such as interpersonal ineffectiveness. It may also have been that although participants indeed felt ineffective, the individual testing in a laboratory context had few personal implications and therefore that the manipulation was not personally relevant enough to induce this process. Indeed, Coelho and colleagues (2008) reported a body displacement effect in restrained eaters following an anxiety induction using a speech threat. It may be that feelings of ineffectiveness with a more interpersonal evaluative component (e.g., feeling embarrassed and unprepared when performing a speech in front of others) may be more likely to lead to body displacement than an unsolvable task that is not witnessed by others.

It is also possible that body displacement is a construct unique to eating disorders. McFarlane and colleagues' (2011) reported body displacement in eating disorder patients, but not restrained eaters, following a manipulation in which participants were asked to imagine a time when they felt particularly ineffective. Their findings suggest that this process might occur only in those with clinical eating pathology, not those with non-clinical eating and weight concerns. Alternatively, particularly given the findings obtained by Coelho and colleagues, it is possible that individuals with eating disorders, and restrained eaters both experience body displacement, but that the mechanism for inducing this process occurs differently for these two groups.

Both implicit measures – the IAT-BI and WSCT – and the explicit state body dissatisfaction measure (i.e., BISS), showed no restraint by condition body displacement effect. Both the BISS (Cash et al., 2002) and the WSCT (Tiggemann et al., 2004) have been shown to be sensitive to state-level context differences. The IAT-BI is a new measure, but previous studies

have shown the IAT to be sensitive to state-level context differences in restrained eaters as well (Hoffmeister et al., 2010). As such, had body displacement been effectively induced, it is these measures that would have been most expected to demonstrate sensitivity to these effects. It may be that these measures were not sensitive enough to detect an effect, though this is unlikely because of their successful use in past research (e.g., detection of body displacement effect using WSCT in McFarlane and colleagues' [2011] study). More likely, as discussed above, body displacement was not successfully induced, and this was reflected in the lack of differences on the implicit and state explicit measures.

However, what remains unclear is the discrepancy between these findings and those obtained on the EDI Body Dissatisfaction subscale and the MSS-Fat. It is not clear why restrained eaters reported higher trait body dissatisfaction and feeling fat in the present moment in the control condition compared to the ineffectiveness condition. One explanation is that these findings are due to Type I errors and that in actuality these effects do not exist. A second possible explanation is that the unsolvable anagram task served as a cognitively taxing “distraction” for the ineffectiveness condition, using cognitive resources and therefore impacting participants' ability to reflect accurately on the questionnaire content.

Another explanation may be due to psychometric issues. The entire MSS scale is a non-validated measure that was created for this study, with the primary purpose of administering a manipulation check item (i.e. the Ineffectiveness item) embedded with a variety of other items under the guise of a mood questionnaire. It is possible that the MSS-Fat is not validly or reliably tapping the feeling fat construct and that this lack of validity is responsible for the relatively anomalous findings. It should also be noted that the MSS-Fat is comprised of a single item, which is not ideal from a psychometric perspective to assess a complex cognitive-affective

construct that may have multiple components and may be experienced as an automatic cognitive process outside of awareness.

It is less clear why the EDI-BD would produce such unanticipated findings (particularly given that they contradict the findings obtained on the BISS and BSQ), as this measure is well-validated and has been used frequently in non-clinical eating- and body-related research. One possibility is that restrained eaters exhibited a defensive response style on the EDI. Johnson, Kirk and Reed (2001) have noted that previously administered measures may provide some indication about the purpose of the study to participants, and that in eating- and body-related research, this may result in elevated sensitivity to item content and subsequent defensive responding. In the present study, the BISS and BSQ were administered prior to the EDI and EDE-Q (the latter two being administered in a randomized order). It may be that the BISS and BSQ were responded to more genuinely because the item content reflects more normative (i.e., non-disordered) body-related concerns, but that when the eating disorder measures were administered, restrained eaters recognized this content and responded defensively so as not create a perceivably undesirable impression of being disordered. This explanation is one tentative possibility to account for these findings, but in the absence of concrete evidence to support this contention, at this time there is no clear explanation for the unexpected results obtained on the EDI-BD.

General Discussion

Collectively, this study developed the IAT-BI to measure implicit body dissatisfaction, and then used this measure in an experiment testing body displacement theory in restrained eaters. In Study 1, the IAT-BI was developed and successfully established as a valid measure of implicit body dissatisfaction in a non-clinical sample. This is a major strength of this project, as these findings directly respond to shortcomings in the literature on implicit processing in

disordered eating and body image research. This literature was cogently summarized by Vartanian and colleagues (2004) who argued that body dissatisfaction should be measured implicitly in studies of cognitive processes related to disordered eating. Specifically, the literature indicates that this type of measure is needed for a variety of reasons, including: cognitive processes in eating and body-related research are not always available to awareness; self-report measures may not be sensitive enough to detect state-based changes in cognitive processing about the body; and because explicit body image measures are subject to demand characteristics that may bias research outcomes. Nevertheless, eight years since the publication of Vartanian and colleagues' (2004) review, no published studies to date could be located that effectively address this gap in the literature. As such, the successful development and preliminary validation of the IAT-BI in Study 1 represents an important and overdue contribution to this literature. This measure may form the basis for future research examining implicit body dissatisfaction, both from a psychometric perspective to further refine and validate this tool, and within experimental research that uses this tool to measure implicit body dissatisfaction as an outcome measure.

In Study 2, the IAT-BI was used as part of a battery of measures to experimentally assess body displacement following the induction of a state of ineffectiveness in non-clinical women. Contrary to our hypotheses, this study did not result in the identification of a body displacement effect between the experimental and control conditions. Nevertheless, this study made an important contribution to the scant body displacement literature by seeking to improve the methodology used in previous experiments. Specifically, body displacement was tested by extending the methods used by McFarlane and colleagues (2011). First, the IAT-BI more directly assessed the cognitive process of interest – implicit body dissatisfaction – as opposed to implicit

appearance-related processing used in their study. In addition, the present study more directly manipulated ineffectiveness using an unsolvable task, which was meant to improve upon McFarlane and colleagues' (2011) manipulation, in which participants were asked to recall a time they previously felt ineffective. From a methodological standpoint, this manipulation had more internal validity, although the results of the current study did not result in the identification of a body displacement effect in female restrained eaters. However, it is important to note that the sparse body displacement literature that exists is fraught with inconsistencies: no effect in restrained eaters (Eldredge et al., 1990); effect in restrained eaters but not in eating disorder patients (Coelho et al., 2008); and effect in eating disorder patients but not restrained eaters (McFarlane et al., 2011). As such, the findings of the present study – no body displacement in restrained eaters – partially replicate some previous findings, although they are also inconsistent with others studies and with the hypotheses. As such, at the present time, experimental findings on body displacement remain inconclusive.

Clinical Implications

Ongoing research into the nature of body displacement may shed light on body displacement as an important clinical target, both for patients with eating disorders and more broadly, women seeking support for poor body image. Understanding the nature and function of body displacement would help clinicians to intervene in this process and support clients in learning more adaptive means of dealing with negative emotions. Clinical intervention for body displacement might start with psychoeducation about the body displacement process, so that the client understands that negative emotions might in fact be experienced as feeling fat. This would set a foundation for new learning to be acquired. Next, the therapist might ask the client to self-monitor her own feelings of fatness for a period of one to two weeks, accompanied by recording

other emotions and the situational context accompanying the feelings of fatness. This would allow the client and therapist to work together to begin making hypotheses about the emotions and/or situations in which body displacement most typically occurs for this individual. In terms of interventions, the clinician might use cognitive techniques such as cognitive restructuring using thought records to address body displacement. The client might be asked to notice her “hot thought” around feeling fat, and then to look for evidence supporting and contradicting this thought, as well as to generate alternative explanations for her thoughts and feelings of fatness. Finally, the clinician might teach the client behavioural strategies for coping with negative emotions that would provide a skill set for her to utilize in place of body displacement. Together, this set of strategies might be useful in supporting clients to reduce the occurrence of body displacement and to cope with negative emotions in a more adaptive manner.

Limitations and Future Directions

Given these findings and ongoing inconsistencies in the literature, future studies should continue to clarify the nature of body displacement – that is, whether it exists, and if so, the populations in which it occurs and the situations or contexts in which it is elicited. This includes continuing to investigate body displacement using experimental paradigms in both eating disordered and restrained eaters, as well as directly manipulating ineffectiveness and other negative emotions in a variety of ways to clarify the contexts under which this phenomenon might take place. Such studies will help to confirm or disconfirm theories about body displacement and feeling fat, and will elucidate and clarify the nature of this mechanism. Following establishment of the nature of body displacement, studies could also be conducted to determine the effects of body displacement on problematic and/or disordered eating behaviours.

Future studies should also investigate the use of the IAT-BI in other samples, such as eating disorder patients, as well as individuals in the community, to determine whether this measure sufficiently assesses implicit body dissatisfaction in these groups. This would further support the use of this measure in studies assessing implicit cognitive processes related to body dissatisfaction. Further psychometric validation of this measure would help to support and justify its use within future experimental research on cognitive processing related to eating and body image. In addition, future studies using the IAT-BI might seek to refine this measure by removing some of the less common or typical body image words (e.g., graceful, delicate) in order to determine whether retaining only extremely common body image words improves the measure's sensitivity to variability in body dissatisfaction.

In addition to its use of only non-clinical, undergraduate participants in both studies, and in Study 2, a manipulation that may not have been adequate to elicit body displacement, there are a number of other limitations to the studies. From a methodological perspective, in Study 2 the group sizes were not equal, with more participants in the unrestrained groups. This is due to the use of a pre-established convention for defining restrained and unrestrained eating, rather than the use of a median split. When samples sizes are unequal, the statistical analyses used in study 2 are not robust to violations of assumptions, particularly heterogeneity of variance, and as such, a number of variables that violated assumptions were transformed prior to being used in analyses. Transformations carry their own limitations and often create additional problems, as well as interpretive difficulties (Field, 2009). Investigation of restraint as a continuous variable or use of statistical analyses that do not rely on parametric assumptions may be more appropriate to analyze such data given their violations of distributional normality.

In addition, it is possible that the studies lacked power in some of their analyses. In Study 1, the correlation between IAT-BI and RS scores approached significance but did not meet it. Similarly, the non-significant correlations between IAT-BI scores and OBCS Total and SPAS scores, respectively, were small but nevertheless not substantially lower than the significant correlations obtained in this study. As discussed, correlations between IAT scores and explicit measures are generally small, and as such, it is possible that Study 1 was underpowered to detect correlations between the IAT-BI and some of the other study variables. A larger sample size may have improved these findings. Study 2 was more clearly underpowered. Power analyses suggested that a sample of at least 93 participants was necessary to detect an effect similar to that obtained in previous research, however only 83 participants could be recruited for the present study. Although it is possible that indeed there was no true body displacement effect (particularly given the directionality of the means), a larger sample size in Study 2 may support more definitive conclusions.

Summary

Body Displacement Theory suggests that some women may mislabel feelings of ineffectiveness or negative emotions as feeling fat. Literature indicates that feeling fat is common in most women, and that restrained eaters report elevated feelings of trait ineffectiveness as well as respond to failure experiences with both disinhibited eating and increased restraint. Experimental studies of Body Displacement Theory have yielded conflicting findings, which have both supported and refuted this theory in eating disordered and restrained eaters. The current study sought to explore this gap in the literature by experimentally investigating Body Displacement Theory using an ineffectiveness manipulation, and a measure of implicit body dissatisfaction developed in Study 1 as an outcome variable. The development

and validation of this measure, the IAT-BI, was the primary successful outcome of this study, filling a longstanding gap in the literature that precluded the accurate measurement of implicit body dissatisfaction. This measure was used as an outcome measure in Study 2, the results of which largely indicated no body displacement effect, contrary to hypotheses. As such, although Study 2 was a carefully designed study that sought to answer an important question within the literature and improve upon the methodology used in previous studies, the results were not fruitful in identifying body displacement as a mechanism between feelings of ineffectiveness and feelings of fatness in non-clinical women. Nevertheless, the results of Study 2 have added to the literature and provide opportunities to further refine and tailor research on body displacement as a means of continuing to investigate this potential mechanism.

Appendix A

Word Lists for IAT-BI

“Positive” Body Words

Slim, Slender, Fit, Light, Firm, Petite, Thin, Slight, In Shape, Small, Toned, Smooth, Dainty,
Trim, Tight, Graceful, Delicate, Lean

“Negative” Body Words

Chubby, Fleshy, Big, Hefty, Heavy, Too Large, Huge, Overweight, Plump, Round, Fat, Bulky,
Wide, Flabby, Chunky, Thick, Saggy, Obese

“Self” Words

I, Me, Myself, “First Name”, “Last Name”

Appendix B

IAT-BI Instructions

Negative Block

You will be required to respond as quickly as possible to a series of words
at the top of the screen.

Press “Z” when you see POSITIVE BODY words.

Press “2” when you see NEGATIVE BODY or SELF words.

Press the spacebar when you are ready.

Positive Block

You will be required to respond as quickly as possible to a series of words
at the top of the screen.

Press “Z” when you see POSITIVE BODY or SELF words.

Press “2” when you see NEGATIVE BODY words.

Press the spacebar when you are ready.

Appendix C

Study 1 Demographic Questionnaire

1. Age: _____
2. Gender (select one): Male Female
2. Country of Birth: _____
3. If you were not born in Canada, how long have you lived in Canada? _____
4. Race/Ethnic Origin: (Please check all that apply)
 - Aboriginal (e.g., Inuit, Métis, North American Indian)
 - Arab/West Asian (e.g., from Egypt, Iran, Lebanon, Morocco)
 - Black (e.g., Africa, Haiti, Jamaica, Somalia)
 - East Asian (e.g., China, Japan, Korea)
 - Latin American (e.g., Mexico, Brazil, Columbia)
 - South Asian (e.g. India, Sri Lanka, Nepal)
 - South East Asian (e.g., Thailand, Philippines, Indonesia)
 - White (e.g., Caucasian, European)
 - If none of the above, please specify: _____
5. Degree Program at Ryerson University: _____
6. Year in University: _____
7. Do you speak fluent English? _____
9. What is your current height? _____
10. How much do you currently weigh (in pounds)? _____
11. What is your maximum weight ever (in pounds)? _____

Appendix D

Study 1 Informed Consent Form¹

“Examining the Relationship between Psychosocial Variables in Undergraduate Students”

CONSENT AGREEMENT

You are being asked to participate in a research study. Before you give your consent to be a volunteer, it is important that you read the following information and ask as many questions as necessary to be sure you understand what you will be asked to do.

Investigators:

Sarah Royal, M.A. Student, Department of Psychology, Ryerson University, Toronto.

Michelle M. Dionne, Ph.D., Department of Psychology, Ryerson University, Toronto.

Purpose of the Study: This is a study examining the relationship between psychosocial variables relevant to undergraduate students. These variables include measures of eating behaviour, body image, and social behaviour. We are hoping to include up to 450 university students in this study.

Description of the Study:

If you choose to participate in this study, you will be asked to complete a battery of questionnaires online. The package includes questionnaires of varying lengths. It is expected that completion of the questionnaire battery will take approximately 50-60 minutes.

What is Experimental in this Study: Most of the questionnaires used in this study are not experimental in nature, in the sense that they have all been used by other researchers and found to be safe and useful. Two of the questionnaires have been developed specifically for this study.

¹ Data for the current study were collected as part of a primary study in our lab evaluating fat talk in women. The informed consent form reflects that primary study. REB approval was obtained for collection of the additional data as a part of the present thesis study.

Risks and Discomforts:

It is possible that you might feel some discomfort when answering questionnaires regarding your thoughts, attitudes, and behaviours. If any aspect of this study makes you uncomfortable, you may temporarily or permanently discontinue your participation without penalty or loss of benefit to which you are entitled.

Benefits of the Study: There is no direct benefit to participants in this study although the information gained from the overall study may improve our understanding of the relationship between various psychosocial variables relevant to young women and men. You are welcome to contact us in 2011 for a report of the results.

Confidentiality: All information collected during this study will be confidential because your name is only collected on this informed consent form, which will be kept separate from the collected data. The data from this study will be kept confidential in the Health and Sport Psychology Lab, to which only the investigators and their research assistants will have access.

Incentives to Participate:

You will receive 1% towards your final mark in PSY102/202. This will be credited immediately following your participation.

Voluntary Nature of Participation: Participation in this study is voluntary. Your choice of whether or not to participate will not influence your grades, academic status, or future relations with Ryerson University or the Department of Psychology. If you decide to participate, you are free to withdraw your consent and to stop your participation at any time without penalty or loss of benefits to which you are allowed. Further, at any time during your participation, you may request that your data be removed from the data set. Should you choose to withdraw from the study, you will still be compensated for your participation.

Questions: If you have any questions about the research you may contact either of the following investigators:

Sarah Royal

(416) 979-5000 ext.4694

sroyal@psych.ryerson.ca

Dr. Michelle Dionne

(416) 979-5000 ext.7103

mdionne@ryerson.ca

If you have any questions regarding your rights as a human subject and participant in this study, you may contact the Ryerson University Research Ethics Board for information:

Ryerson Ethics Board c/o Office of the Vice President, Research and Innovation

Ryerson University 350 Victoria Street, Toronto, ON M5B 2K3 416-979-5042

In answering some of the items on the questionnaires, some individuals may feel mild discomfort because the items are asking you to reflect on your attitudes and behaviours. If completing any of these measurements raises concerns that you would like to discuss, please contact the:

Centre for Student Development and Counselling (CSDC) located in Jorgenson Hall (JOR-07C), 416-979-5195, csdc@ryerson.ca

If you any have questions about receiving your Psychology 102/202 credit for participation please contact:

(416) 979-5000 ext. 7727 or psychpool@ryerson.ca

Agreement: By clicking the button below, it indicates that you have read the information in this agreement. It also indicates that you agree to be in the study and have been told that you can change your mind and withdraw your consent to participate at any time, and have your data removed from the dataset.

You are aware that by providing your approval to this consent agreement you are not giving up any of your legal rights.

Appendix E

Study 1 Debrief Form²

DEBRIEFING FORM

Thank you for participating in this study! The purpose of this study was to assess the validity and reliability of a newly developed scale assessing fat talk. Fat talk refers to conversations among women involving negative comments and criticisms about their bodies. We were also interested in examining the relationship between fat talk and other theoretically-relevant variables such as body satisfaction, restrained eating, self-objectification, social physique anxiety, and social desirability. To ensure that the new fat talk scale does not just measure social behaviour, we also included a newly developed scale assessing the amount of talk in an unrelated topic, academics. Comparing the new fat talk scale to these variables allows us to assess the scale's construct validity; that is, how well the scale measures fat talk.

Questions: If you have any questions about the research you may contact either of the following investigators:

Sarah Royal	(416) 979-5000 ext.4694	sroyal@psych.ryerson.ca
Dr. Michelle Dionne	(416) 979-5000 ext.7103	mdionne@ryerson.ca

If you having any questions regarding your rights as a human subject and participant in this study, you may contact the Ryerson University Research Ethics Board for information:

Ryerson Ethics Board c/o Office of the Vice President, Research and Innovation
Ryerson University 350 Victoria Street, Toronto, ON M5B 2K3 416-979-5042

In answering some of the items on the questionnaires, some individuals may feel mild discomfort because the items are asking you to reflect on your attitudes and behaviours. If completing any of these measurements raises concerns that you would like to discuss, please contact the:

Centre for Student Development and Counselling (CSDC) located in Jorgenson Hall (JOR-07C),
416-979-5195, csdc@ryerson.ca

² Data for the current study were collected as part of a primary study in our lab evaluating fat talk in women. The debrief form reflects that primary study. REB approval was obtained for collection of the additional data as a part of this present thesis study.

If you any have questions about receiving your Psychology 102/202 credit for participation please contact:

(416) 979-5000 ext. 7727 or psychpool@ryerson.ca

If you are interested in the results of this study, please contact Sarah Royal in September, 2010 for a copy of the findings:

Sarah Royal (416) 979-5000 ext.4694 sroyal@psych.ryerson.ca

Thank you again for participating and have a nice day!

Appendix F

Anagram Puzzle Tasks – Ineffectiveness Condition

Instructions: Please take 7 minutes to solve the following anagram (scrambled word) puzzles.

Most people are able to solve these puzzles in 7 minutes.

HUOCGL _____

GAWNOP _____

CIOTNL _____

NTRAI _____

BNLOET _____

OCBNAY _____

SPAUAN _____

PADUS _____

ALAVT _____

DBHOC _____

Appendix G

Anagram Puzzle Tasks – Control Condition

Instructions: Please take 7 minutes to work on the following anagram (scrambled word) puzzles.

Most people are able to solve these puzzles in 7 minutes

AEWTR _____

NTRAI _____

EUOHS _____

IHRCA _____

LCOHT _____

UGARS _____

IUFTR _____

TNKOE _____

YNCFA _____

RUCHS _____

Appendix H

Visual Analog Scale Manipulation Check

Please rate how you feel right now by making a mark on the horizontal line.

1.

Ineffective Effective

2.

Successful Unsuccessful

3.

Anxious Calm

4.

Depressed Not Depressed

5.

Not Fat Fat

6.

Not Attractive Attractive

7.

Relaxed Tense

8.

In Control Out of Control

9.

Worn Out Energetic

10.

Not Angry Angry

Appendix I

Study 2 Demographic Questionnaire

1. Age: _____
2. Gender: _____
3. Sexual Orientation:
 - Heterosexual/Straight
 - Lesbian
 - Bisexual
 - Other (Please specify) _____
4. Country of Birth: _____
5. If you were not born in Canada, how long have you lived in Canada? _____
6. Race/Ethnic Origin: (Please check all that apply)
 - Aboriginal (e.g., Inuit, Métis, North American Indian)
 - Arab/West Asian (e.g., from Egypt, Iran, Lebanon, Morocco)
 - Black (e.g., Africa, Haiti, Jamaica, Somalia)
 - East Asian (e.g., China, Japan, Korea)
 - Latin American (e.g., Mexico, Brazil, Columbia)
 - South Asian (e.g. India, Sri Lanka, Nepal)
 - South East Asian (e.g., Thailand, Philippines, Indonesia)
 - White (e.g., Caucasian, European)
 - If none of the above, please specify: _____
7. Do you speak fluent English? _____

Appendix J

Study 2 Informed Consent Form³

CONSENT TO PARTICIPATE IN A RESEARCH STUDY

TITLE: Investigating individual differences in cognitive performance, reaction time, and health-related variables in women.

INVESTIGATORS: Dr. Traci McFarlane (Toronto General Hospital, traci.mcfarlane@uhn.on.ca), Dr. Michelle Dionne (Ryerson University, mdionne@psych.ryerson.ca) and Ms. Danielle MacDonald (MA Student, Ryerson University, danielle.macdonald@psych.ryerson.ca)

This study will take place in the Health and Sport Psychology Lab at Ryerson University. You are being asked to take part in a research study. Please read this explanation about the study and its risks and benefits before you decide if you would like to take part. You should take as much time as you need to make your decision. You should ask the researcher to explain anything that you do not understand and make sure that all of your questions have been answered before signing this consent form. Before you make your decision, feel free to talk about this study with anyone you wish. Participation in this study is voluntary.

Background and Purpose

The purpose of this study is to investigate how health-, eating- and body-related differences impact cognition and reaction time. It has been suggested that studying cognitive performance and reaction time may tell us more about some of the underlying processes that occur in certain health related issues. Although this is believed to be true, there have been virtually no studies aimed at testing this assumption. This study that you are about to participate in will test this theory, and will provide information about the understanding of how health-related variables impact cognition.

³ The current study was part of a larger study that included the recruitment of eating disorder patients, who were not included as part of the current thesis. The informed consent form reflects this.

Procedures

- *Your participation in this study will involve a time commitment of one-hour in total.*
- *You will either be randomly assigned (like flipping a coin) to complete one of two types of puzzle sets, after which you will be asked to complete a reaction time task. Approximately 45 people will be assigned to each condition.*
- *After you are finished completing the reaction time task, you will be asked to complete a number of questionnaires addressing health, eating and body-related thoughts, attitudes, emotions and behaviours and information about yourself, for comparison purposes.*
- *After all tasks are complete, your height and weight will be measured.*

Risks Related to Being in the Study

Some aspects of the study may affect your feelings, thoughts or interactions with others for a short period of time. Some questions are personal and you might feel uncomfortable answering them. It is important that you know that you do not have to answer any question you do not wish to answer.

Benefits to Being in the Study

By participating in this study, you will receive 1% course credit towards your PSY 102 or 202 course. Otherwise, you will not receive any direct benefit from being in this study. Information learned from this study may help other people in the future.

Confidentiality

All information collected during this study will be confidential because your name, contact information and student number will not appear anywhere on the questionnaires, measurements, or data. Rather, your information will be identified by a number only. This consent form is the only place that your name and contact information will appear and it will be filed separately from your data. If you are participating for Psychology 102 or 202 partial academic credit, a separate form will collect your student ID number and it will be filed separately from your data.

If you agree to join this study, the research team will look at the information you provide during the study. The information that is collected for the study will be kept in a locked and secure area

by the researchers for 7 years. Only the study team or the people or groups listed below will be allowed to look at your data.

Representatives of Ryerson University Research Ethics Board may look at the study to make sure the study followed proper laws and guidelines. All information collected during this study will be kept confidential and will not be shared with anyone outside the study unless required by law. You will not be named in any reports, publications, or presentations that may come from this study.

If you decide to withdraw from the study, your data will be destroyed and will no longer be used in this study.

Participation

Your participation in this study is voluntary. You may decide not to be in this study, or to be in the study now and then change your mind later. You may leave the study at any time without affecting your grades in PSY 102 or 202. You have the right to withdraw from the study at any time without penalty, or to remove your data from the study if you wish. However, due to the anonymous nature of the study (i.e. your name is not attached to your data), if you want to remove your data, it is necessary to indicate this before leaving the study session. Should you choose to withdraw from the study, you will still be compensated for your participation. You are also free to choose to “walk-through” the study without penalty or loss of benefits. This will allow you to experience participation in the study but your data will not be included in the final data set.

In Case You Are Harmed in the Study

If you become ill, injured or harmed as a result of taking part in this study, you will receive care. The reasonable costs of such care will be covered for any injury, illness or harm that is directly a result of being in this study. In no way does signing this consent form waive your legal rights nor does it relieve the investigators, or involved institutions from their legal and professional responsibilities. You do not give up any of your legal rights by signing this consent form.

Appendix K

Study 2 Debrief Form⁴

Debriefing Form: A Study of Body Displacement in Eating Disorders

You have participated in a research study conducted by Dr. Traci McFarlane (Toronto General Hospital), Dr. Michelle Dionne (Ryerson University) and Ms. Danielle MacDonald (MA Student, Ryerson University) as part of a Masters thesis.

Background Information: Theories about eating disorders suggest that individuals with eating disorders may “displace” negative emotions onto their bodies. This means that when people with eating disorders feel negative emotions such as ineffectiveness, they may transfer these feelings onto their bodies, resulting in “feeling fat”. This theory is used in the treatment of eating disorders to explain why feeling ineffective often leads to feeling fat for people with eating disorders, but only one study has directly tested this idea using an experiment.

Purpose of the Study: In this study, we wish to understand whether feelings of ineffectiveness lead to feelings of fatness in people with eating disorders. This study is important to the study and treatment of eating disorders because it helps us to understand some of the mechanisms taking place in people with eating disorders.

Design of the Study: In this study, we recruited participants from Ryerson University, as well as individuals with eating disorders from Toronto General Hospital. We assigned half of the participants to complete anagrams (scrambled word puzzles) that could be easily solved, and the other half to words that could not be solved. It was expected that being in the group with the unsolvable puzzles would lead people to feel ineffective. Following this, all participants completed measures of body image, dieting, mood and eating disorder symptoms. Although we highlighted that cognitive and reaction time tasks would be studied, we did not fully disclose the true purpose of our study. We regret this lack of disclosure, but it was necessary to prevent biased responding and to ensure a true reflection of attitudes and behaviours from participants.

⁴ The current study was part of a larger study that included the recruitment of eating disorder patients, who were not included as part of the current thesis. The debrief form reflects this.

Expected Results

- Individuals with eating disorders who were made to feel ineffective will have lower body image and more urges to engage in eating disordered behaviours following the task.
- This effect will not be present in individuals without eating disorders.

Questions and Concerns: if completing any of these measurements or participating in this study raises psychological concerns that you would like to discuss, please contact the: Centre for Student Development and Counseling (CSDC), JOR-07C, 416-979-5195, csdc@ryerson.ca.

If you have any questions about this study please contact Dr. Michelle Dionne (mdionne@ryerson.ca), Dr. Traci McFarlane (traci.mcfarlane@uhn.on.ca) Danielle MacDonald (danielle.macdonald@psych.ryerson.ca). You may contact us after August 2012 if you would like to receive a copy of the results form this study.

You may withdraw from the study and remove your data from the study without penalty if you wish. Due to the anonymous nature of the study (i.e. your name is not attached to your data), if you want to remove your data, it is necessary to indicate this before leaving the study session.

If you have any questions regarding your rights as a human subject and participant in this study, you may contact the Ryerson University Research Ethics Board for information: c/o Office of the Vice President, Research and Innovation, Ryerson University, 350 Victoria Street, Toronto ON, M5B 2k3 416-979-5042

If you have questions about receiving your Psychology 102/202 credit for participation please contact: psychpool@ryerson.ca

References

- Ackard, D. M., Croll, J. K., & Kearney-Cooke, A. (2002). Dieting frequency among college females: Association with disordered eating, body image, and related psychological problems. *Journal of Psychosomatic Research, 52*, 129-136. doi:10.1016/S0022-3999(01)00269-0,
- Ahern, A. L., Bennett, K. M., & Hetherington, M. M. (2008). Internalization of the ultra-thin ideal: Positive implicit associations with underweight fashion models are associated with drive for thinness in young women. *Eating Disorders, 16*, 294-307.
doi:10.1080/10640260802115852
- Ahern, A. L., & Hetherington, M. M. (2006). The thin ideal and body image: An experimental study of implicit attitudes. *Psychology of Addictive Behaviors, 20*, 338-342.
doi:10.1037/0893-164X.20.3.338
- Baumeister, R. F. (1999). *The self in social psychology*. Ann Arbor, MI: Taylor & Francis.
- Bruch, H. (1978). *The golden cage: The enigma of anorexia nervosa*. Cambridge MA: Harvard University Press.
- Cachelin, F. M., Striegel-Moore, R., & Paget, W. B. (1997). Comparison of women with various levels of dietary restraint on body image, personality, and family environment. *Eating Disorders, 5*, 205-215. doi:10.1080/10640269708249226
- Cash, T. F. (2011). Cognitive-behavioral perspectives on body image. In T. F. Cash & L. Smolak (Eds.), *Body image: A handbook of science, practice, and prevention* (pp. 39-47). New York: Guilford.

- Cash, T.F., Fleming, E., Alindogan, J., Steadman, L., & Whitehead, A. (2002). Beyond body image as a trait: The development and validation of the Body Image States Scale. *Eating Disorders, 10*, 103-113. doi:10.1080/10640260290081678
- Cassin, S. E., & von Ranson, K. M. (2005). Word lists for testing cognitive biases in eating disorders. *European Eating Disorders Review, 13*, 216-220. doi:10.1002/erv.607
- Coelho, J. S., Carter, J. C., McFarlane, T., & Polivy, J. (2008). “Just looking at food makes me gain weight”: Experimental induction of thought-shape fusion in eating-disordered and non-eating-disordered women. *Behaviour Research and Therapy, 46*, 219-228. doi:10.1016/j.brat.2007.11.004
- Cooley, E., & Toray, T. (2001). Body image and personality predictors of eating disorder symptoms during the college years. *International Journal of Eating Disorders, 30*, 28-36. doi:10.1002/eat.1051
- Cooper, P.J., Taylor, M.J., Cooper, Z., & Fairburn, C.G. (1987). The development and validation of the Body Shape Questionnaire. *International Journal of Eating Disorders, 6*, 485-494. doi: 0.1002/1098-108X(198707)6:4<485::AID-EAT2260060405 >3.0.CO;2-O
- Cooper, M. J., Deepak, K., Grocutt, E., & Bailey, E. (2007). The experience of ‘feeling fat’ in women with anorexia nervosa, dieting and non-dieting women: An exploratory study. *European Eating Disorders Review, 15*, 366-372. doi:10.1002/erv.785
- Crowne, D. P., & Marlowe, D. (1960). A new scale of social desirability independent of psychopathology. *Journal of Consulting Psychology, 24*, 349-354. doi:10.1037/h0047358
- DeCoster, J., Iselin, A.-M., R., & Gallucci, M. (2009). A conceptual and empirical examination

of justifications for dichotomization. *Psychological Methods*, 14, 349-366.

doi:10.1037/a0016956

Eisenberg, D., Nicklett, E. J., Roeder, K., & Kirz, N. E. (2011). Eating disorder symptoms among college students: Prevalence, persistence, correlates, and treatment-seeking.

Journal of American College Health, 59, 700-707. doi: 10.1080/07448481.2010.546461

Eldredge, K., Wilson, G. T., & Whaley, A. (1990). Failure, self-evaluation, and feeling fat in women. *International Journal of Eating Disorders*, 9, 37-50. doi:10.1002/1098-108X(199001)9:1<37::AID-EAT2260090105>3 .0.CO;2-3

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

Fairburn, C. G., & Cooper, Z. (1993). The Eating Disorder Examination (12th edition). In C. G. Fairburn & G. T. Wilson (Eds.), *Binge eating: Nature, assessment and treatment*. New York: Guilford.

Fairburn, C. G., Cooper, Z., & O'Connor, M. E. (2008). Eating Disorder Examination (Edition 16.0D). In C. G. Fairburn (Ed.), *Cognitive behavior therapy and eating disorders* (pp. 265-308). New York: Guilford.

Fairburn, C. G., Cooper, Z., Shafran, R., Bohn, K., Hawker, D., Murphy, R., & Straebl, S. (2008). Shape concern, shape checking, feeling fat and mindsets. In C. G. Fairburn (Ed.), *Cognitive behavior therapy and eating disorders* (pp. 96-123). New York: Guilford.

Farnham, S. D., Greenwald, A. G., & Banaji, M. R. (1999). In D. Abrams & M. A. Hogg (Eds.), *Social identity and social cognition* (pp. 230-248). Malden MA: Blackwell Publishing.

- Favaro, A., Ferrara, S., & Santonastaso, P. (2003). The spectrum of eating disorders in young women: A prevalence study in a general population sample. *Psychosomatic Medicine*, *65*, 701-708. doi:0033-3174/03/6504-0701
- Ferrier, A. G., & Martens, M. P. (2008). Perceived incompetence and disordered eating among college students. *Eating Behaviors*, *9*, 111-119. doi:10.1016/j.eatbeh.2007.06.004
- Field, A. (2009). *Discovering statistics using SPSS*. London: Sage.
- Forbush, K., & Watson, D. (2006). Emotional inhibition and personality traits: A comparison of women with anorexia, bulimia, and normal controls. *Annals of Clinical Psychiatry*, *18*, 115-121. doi:10.1080/10401230600614637
- Garner, D. M., & Olmsted, M. P. (1984). *The Eating Disorder Inventory manual*. Odessa, FL: Psychological Assessment Resources.
- Garner, D. M., Olmsted, M. P., & Polivy, J. (1983). Development and validation of a multidimensional eating disorder inventory for anorexia nervosa and bulimia. *International Journal of Eating Disorders*, *2*, 15-34. doi: 10.1002/1098-108X(198321)2:2<15::AID-EAT2260020203>3 .0.CO;2-6
- Greenwald, A. G., McGhee, D. E., & Schwartz, J. L. K. (1998). Measuring individual differences in implicit cognition: The Implicit Association Test. *Journal of Personality and Social Psychology*, *74*, 1464-1480. doi:10.1037/0022-3514.74.6.1464
- Greenwald, A. G., Nosek, B. A., & Banaji, M. R. (2003). Understanding and using the implicit association test: I. An improved scoring algorithm. *Journal of Personality and Social Psychology*, *85*, 197-216. doi:10.1037/0022-3514.85.2.197
- Hart, E. A., Leary, M. R., & Rejeski, W. J. (1989). The measurement of social physique anxiety. *Journal of Sport and Exercise Psychology*, *11*, 94-104.

- Heatherton, T. F., & Baumeister, R. F. (1991). Binge eating as escape from self-awareness. *Psychological Bulletin, 110*, 86-108. doi:10.1037/0033-2909.110.1.86
- Heatherton, T. F., Herman, C. P., Polivy, J., King, G. A., & McGree, S. T. (1988). The (mis)measurement of restraint: An analysis of conceptual and psychometric issues. *Journal of Abnormal Psychology, 97*, 19-28. doi: 10.1037/0021-843X.97.1.19
- Heatherton, T. F., Polivy, J., Herman, C. P., & Baumeister, R. F. (1993). Self-awareness, task failure, and disinhibition: How attentional focus affects eating. *Journal of Personality, 61*, 49-61. doi:10.1111/j.1467-6494.1993.tb00278.x
- Heatherton, T. F., Striipe, M., & Wittenberg, L. (1998). Emotional distress and disinhibited eating: The role of self. *Personality and Social Psychology Bulletin, 24*, 301-313. doi:10.1177/0146167298243007
- Herman, C. P., & Polivy, J. (1980). Restrained eating. In A. J. Stunkard (Ed.), *Obesity* (pp. 208-225). Philadelphia: Saunders.
- Hoffmeister, K., Teige-Mocigemba, S., Blechert, J., Klauer, K. C., & Tuschen-Caffier, B. (2010). Is implicit self-esteem linked to shape and weight concerns in restrained and unrestrained eaters? *Journal of Behavior Therapy and Experimental Psychiatry, 41*, 31-38. doi:10.1016/j.jbtep.2009.08.009
- Houben, K., Roefs, A., & Jansen, A. (2010). Guilty pleasures: Implicit preferences for high calorie food in restrained eating. *Appetite, 55*, 18-24. doi:10.1016/j.appet.2010.03.003
- Jasper, K. (1993). Out from under body-image disparagement. In C. Brown and K. Jasper (Eds.), *Consuming passions: Feminist approaches to weight preoccupation and eating disorders* (pp. 195-218). Toronto ON: Second Story Press.
- Johnson, W. G., Kirk, A., & Reed, A. E. (2001). Adolescent version of the Questionnaire of

- Eating and Weight Patterns: Reliability and gender differences. *International Journal of Eating Disorders*, 29, 94-96. doi:10.1002/1098-108X(200101)29:1<94::AID-EAT16>3.0.CO;2-8
- Karpinski, A., & Steinman, R. B. (2006). The single category implicit association test as a measure of implicit social cognition. *Journal of Personality and Social Psychology*, 91, 16-32. doi:10.1037/0022-3514.91.1.16
- Kruglanski, A. W., & Higgins, E. T. (2007). *Social psychology: Handbook of basic principles*. New York: Guilford.
- Laessle, R. G., Tuschl, R. J., Kotthaus, B. C., & Pirke, K. M. (1989). A comparison of the validity of three scales for the assessment of dietary restraint. *Journal of Abnormal Psychology*, 98, 504-507. doi:10.1037/0021-843X.98.4.504
- MacCallum, R. C., Zhang, S., Preacher, K., & Rucker, D. D. (2002). On the practice of dichotomization of quantitative variables. *Psychological Methods*, 7, 19-40. doi:10.1037//1082-989X.7.1.19
- McFarlane, T., Urbaszat, D., & Olmsted, M. P. (2011). "I feel fat": An experimental induction of body displacement in disordered eating. *Behaviour Research and Therapy*, 49, 289-293. doi: 10.1016/j.brat.2011.01.008
- McKinley, N. M., & Hyde, J. S. (1996). The Objectified Body Consciousness Scale: Development and validation. *Psychology of Women Quarterly*, 20, 181-215. doi:10.1111/j.1471-6402.1996.tb00467.x
- Mond, J. M., Hay, P. J., Rodgers, B., & Owen, C. (2006). Eating Disorder Examination Questionnaire (EDE-Q): Norms for young adult women. *Behaviour Research and Therapy*, 44, 53-62. doi: 10.1016/j.brat.2004.12.003

- Mond, J. M., Hay, P. J., Rodgers, B., Owen, C., & Beumont, P. J. V. (2004). Validity of the Eating Disorder Examination Questionnaire (EDE-Q) in screening for eating disorders in community samples. *Behaviour Research and Therapy*, 42, 551-567. doi:10.1016/S0005-7967(03)00161-X
- Morris, M. E., Goldsmith, T. E., Roll, S., & Smith, J. E. (2001). A model for assessing the self-schemas of restrained eaters. *Cognitive Therapy and Research*, 25, 201-214. doi:10.1023/A:1026472009449
- Muraven, M., & Baumeister, R. F. (2000). Self-regulation and depletion of limited resources: Does self-control resemble a muscle? *Psychological Bulletin*, 126, 247-259. doi:10.1037//0033-2909.126.2.247
- Norwood, S. J., Bowker, A., Buchholz, A., Henderson, K. A., Goldfield, G., Flament, M. F. (2011). Self-silencing and anger regulation as predictors of disordered eating among adolescent females. *Eating Behaviors*, 12, 112-118. doi:10.1016/j.eatbeh.2011.01.009
- O'Brian, K. S., Hunter, J. A., Halberstadt, J., & Anderson, J. (2007). Body image and explicit and implicit anti-fat attitudes: The mediating role of physical appearance comparisons. *Body Image*, 4, 249-256. doi:10.1016/j.bodyim.2007.06.001
- Ogden, J., & Munday, K. (1996). The effect of the media on body satisfaction: The role of gender and size. *European Eating Disorders Review*, 4, 171-182. doi:10.1002/(SICI)1099-0968(199609)4:3<171::AID-ERV132>3.0.CO;2-U
- Polivy, J., Heatherton, T. F., & Herman, C. P. (1988). Self-esteem, restraint, and eating behaviour. *Journal of Abnormal Psychology*, 97, 354-356. doi: 10.1037/0021-843X.97.3.354
- Polivy, J., & Herman, C. P. (1985). Dieting and bingeing: A causal analysis. *American*

- Psychologist*, 40, 193-201. doi: 10.1037/0003-066X.40.2.193
- Polivy, J., & Herman, C. P. (1991). Good and bad dieters: Self-perception and reaction to a dietary challenge. *International Journal of Eating Disorders*, 10, 91-99. doi: 10.1002/1098-108X(199101)10:1<3.0.CO;2-6
- Polivy, J., & Herman, C. P. (1999). Distress and eating: Why do dieters overeat? *International Journal of Eating Disorders*, 26, 153-164. doi:10.1002/(SICI)1098108X(199909)26:2<153::AID-EAT4>3.0.CO;2-R
- Polivy, J., Herman, C. P., & Warsh, S. (1978). Internal and external components of emotionality in restrained and unrestrained eaters. *Journal of Abnormal Psychology*, 87, 497-504. doi:10.1037/0021-843X.87.5.497
- Polivy, J., Herman, C. P., Younger, J. C., & Erskine, B. (1979). Effects of a model on eating behavior: The induction of a restrained eating style. *Journal of Personality*, 47, 100-117. doi:10.1111/j.1467-6494.1979.tb00617.x
- Pook, M., Tuschen-Caffier, B., & Braehler, E. (2008). Evaluation and comparison of different versions of the Body Shape Questionnaire. *Psychiatry Research*, 158, 67-73. doi:10.1016/j.psychres.2006.08.002
- Rezek, P. J., & Leary, M. R. (1991). Perceived control, drive for thinness, and food consumption: Anorexic tendencies as displaced reactance. *Journal of Personality*, 59, 129-142. doi:10.1111/j.1467-6494.1991.tb00771.x
- Rodin, J., Silberstein, L., & Striegel-Moore, R. (1984). Women and weight: A normative discontent. *Nebraska Symposium on Motivation*, 32, 267-307.
- Rosen, J. C., Jones, A., Ramirez, E., & Waxman, S. (1996). Body Shape Questionnaire: Studies

- of validity and reliability. *International Journal of Eating Disorders*, *20*, 315-319.
doi:10.1002/(SICI)1098-108X(199611)20:3<315::AID-EAT11>3.0.CO;2-Z
- Ruderman, A. J. (1983). The restraint scale: A psychometric investigation. *Behaviour Research and Therapy*, *21*, 253-258. doi: 10.1016/0005-7967(83)90207-3
- Schwartz, M. B., Vartanian, L. R., Nosek, B. A., & Brownell, K. D. (2006). The influence of one's own body weight on implicit and explicit anti-fat bias. *Obesity*, *14*, 440-447.
- Silberstein, L. R., Striegel-Moore, R. H., & Rodin, J. (1987). Feeling fat: A woman's shame. In H. B. Lewis (Ed.), *The role of shame in symptom formation* (pp. 89-108). Hillsdale, NJ: Erlbaum Associates.
- Stephens, G. C., Prentice-Dunn, S., & Spruill, J. C. (1994). Public self-awareness and success-failure feedback as disinhibitors of restrained eating. *Basic and Applied Social Psychology*, *15*, 509-521. doi:10.1207/s15324834basps1504_7
- Striegel-Moore, R., McAvay, G., & Rodin, J. (1986). Psychological and behavioural correlates of feeling fat in women. *International Journal of Eating Disorders*, *5*, 935-947.
doi:10.1002/1098-108X(198607)5:5<935::AID-EAT2260050514>3.0.CO;2-0
- Tabachnick, B. G., & Fidell, L. S. (2001). *Using multivariate statistics*. Boston MA: Pearson.
- Taylor, M. A. (2003). The effects of success and failure situations in relation to hope and explanatory style for perfectionists. (Doctoral dissertation). Retrieved from Proquest Information and Learning Company. (3115595).
- Tiggemann, M. (1996). "Thinking" versus "feeling" fat: Correlates of two indices of body image dissatisfaction. *Australian Journal of Psychology*, *48*, 21-25.
doi:10.1080/00049539608259501
- Tiggemann, M., Hargreaves, D., Polivy, J., & McFarlane, T. (2004). A word-stem completion

- task to assess implicit processing of appearance-related information. *Journal of Psychosomatic Research*, 57, 73-78. doi:10.1016/S0022-3999(03)00565-8
- Toburen, T., & Meier, B. P. (2010). Priming God-related concepts increases anxiety and task persistence. *Journal of Social and Clinical Psychology*, 29, 127-143.
doi:10.1521/jscp.2010.29.2.127
- van Strien, T., Frijters, J. E., Bergers, G. P. & Defares, P. B. (1986). The Dutch Eating Behavior Questionnaire (DEBQ) for assessment of restrained, emotional, and external eating behaviour. *International Journal of Eating Disorders*, 5, 295-315. doi:10.1002/1098-108X(198602)5:2<295::AID-EAT2260050209>3.0.CO;2-T
- Vartanian, L. R., Polivy, J., & Herman, C. P. (2004). Implicit cognitions and eating disorders: Their application in research and treatment. *Cognitive and Behavioral Practice*, 11, 160-167. doi:10.1016/S1077-7229(04)80027-0
- Verplanken, B., & Tangelder, Y. (2011). No body is perfect: The significance of habitual negative thinking about appearance for body dissatisfaction, eating disorder propensity, self-esteem and snacking. *Psychology and Health*, 26, 685-701.
doi:10.1080/08870441003763246
- Vitousek, K. B., & Hollon, S. D. (1990). The investigation of schematic content and processing in eating disorders. *Cognitive Therapy and Research*, 14, 191-214.
doi:10.1007/BF01176209
- Vohs, K. D., Baumeister, R. F., & Ciarocco, N. J. (2005). Self-regulation and self-presentation: Regulatory resource depletion impairs impression management and effortful self-presentation depletes regulatory resources. *Journal of Personality and Social Psychology*, 88, 632-657. doi:10.1037/0022-3514.88.4.632

Wardle, J., & Foley, E. (1989). Body image: Stability and sensitivity of body satisfaction and body size estimation. *International Journal of Eating Disorders*, 8, 55-62.

doi:10.1002/1098-108X(198901)8:1<55::AID-EAT2260080106>3.0.CO;2-D

Werrij, M. Q., Roefs, A., Janssen, I., Stapert, D., Wolters, G., Mulkens, S., ... Jansen, A. (2009).

Early associations with palatable foods in overweight and obesity are not disinhibition related but restraint related. *Journal of Behavior Therapy and Experimental Psychiatry*,

40, 136-146. doi:10.1016/j.jbtep.2008.07.0