EXPERIMENTAL EXPOSURE TO IDEAL-BODY MEDIA IMAGES: RESTRAINED EATERS' SELF-EVALUATION, MOOD AND FOOD INTAKE

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Abstract

The mass media project a thin "ideal" female body type (ideal-body media; IBM) onto young women. Sociocultural theorists propose that, through processes of internalisation and social comparison, IBM-exposure promotes negative body satisfaction and unhealthy eating behaviour. In three experiments, I investigated how IBM-exposure affected restrained eaters. Restrained eaters are women who are trying to lose weight by attempting to restrict their food intake. Previous researchers have found that restrained eaters perceive and process body-related information more readily than others do. The literature surrounding restrained eaters' IBM-related self-evaluations and food intake is inconsistent. Some researchers have found restrained eaters to report positive self-evaluative effects and others have not. Furthermore, the majority of researchers report that viewing IBM triggers restrained eaters' eating. However, this effect is not always replicated and this might be because restrained eaters have been identified with different restraint scales. To test this idea, I used two conceptually different dietary restraint scales throughout the current experiments: the concern for dieting subscale of the Restraint Scale (RS-CD) and the Dietary Intent Scale (DIS). Furthermore, because some researchers have argued that participants within previous (non-restraint) studies ***reported*** negative IBM-effects because they thought that they were meant to be negatively affected (i.e., demand characteristics), reducing these demands was a focus throughout the current experiments. In Study 1, demand characteristics were minimised by employing implicit outcome measures and by incorporating a two-study pre-text to separate the experimental manipulation from the explicitly measured dependent variables. Under the guise of a hunger and memory study, restrained and unrestrained eaters (N = 107) were required to concentrate on a slideshow of IBM- or Control-images for 2-minutes and complete an associated memory test (i.e., advertent attention). Restrained eaters (RS-CD and DIS) exposed to IBM ***reported*** negative effects (e.g., mood). However, IBM-exposure did not trigger their food intake in an ***unrelated*** taste test with M&Ms. I interpreted these findings alongside control theory. This is the theory that goal-related negative affect

encourages increased goal-performance. I reasoned that paying advertent attention to the IBM caused goal-related negative affect, which triggered goal effort (i.e., dietary restraint). This theory was further tested in Study 2. The same manipulation was used in Study 2 ($N = 268$), which was touted as a study about participants' personality and task performance. Here, I aimed to test restrained eaters' implicit approach and avoidance tendencies toward diet and food stimuli. Therefore, a joystick lexical decision task (LDT) was used instead of a taste test. Restrained eaters' self-evaluations (e.g., self-esteem) were not significantly affected by being in different experimental conditions. However, restrained eaters (RS-CD) in the IBM-condition avoided high-calorie food words during the LDT significantly faster than other participants did. These results (Studies 1 and 2) differed from previous research. This difference was attributed to the high level of advertent attention participants paid to the IBM in my experiments. Therefore, in Study 3, I manipulated participants' attention levels. Participants ($N = 171$) were made to believe that the experimental slideshow and LDT were part of a task performance study. Although participants who were assigned to the Inadvertent- and Advertent-Attention conditions were exposed to the same slideshow (IBM- or Neutral-images), the experimenter did not ask participants in the Inadvertent-condition to focus on the slideshow. After this experimental manipulation, participants completed the joystick LDT. Subsequently, they completed a second ***unrelated*** study about personality and the five human senses (e.g., taste, touch, etcetera). All participants were ***randomly assigned*** to the taste-condition and completed a taste test. Inconsistent with my previous results, I did not obtain significant self-evaluation or LDT results. Furthermore, restrained eaters (RS-CD) who paid advertent attention to the IBM consumed more food than others consumed during the taste test. In comparison, restrained eaters were buffered from this effect if they had paid inadvertent attention to the IBM-images. When comparing these (nonsignificant and significant) results with previous research, it seems that restrained eaters' IBM-responses are highly specific to environmental and/or experimental settings. I developed a preliminary theory to predict restrained eaters' behaviour. This theory

takes into account participants' restraint status, restraint success, IBM-related attention and their eating-related attention.

Chapter 1

Introduction

Sociocultural theorists propose that peer groups, family members and the mass media can all promote thinness (e.g., Stice, 1994). Of these channels, the mass media are the most pervasive (Blowers, Loxton, Grady-Flesser, Occhipinti, & Dawe, 2003; Tiggemann, Gardiner, & Slater, 2000). They are a profit maximising communication tool and produce messages for large, anonymous and diverse audiences (Harris, 1994; Levine & Smolak, 1996). Throughout history, the media has generated and presented women with sociocultural norms for the ideal-body size and physical appearance. As a result, the ideal-body type is a cultural construction (Brown & Witherspoon, 2002). From the fifteenth to the eighteenth centuries, the dominant form of communication (i.e., media) was visual art. Because this art romanticised full-figured women, larger women were considered fashionable (Clark, 1980; Fallon, 1990). However, by the late nineteenth century, middle-class women became fixated with managing their weight and appearance. They began wearing binding garments and restricting their food intake (Bordo, 1990; Fallon, 1990). In the 1920s, the introduction of Hollywood film and the use of women in advertising reinforced these weight-management behaviours (Warner, 1985; Wykes & Gunter, 2005). As women increasingly fixated on thinness, medical concerns about disordered eating behaviour emerged (Fallon, 1990). The full-figured fashion briefly returned during the 1940s and the 1950s (e.g., Marilyn Monroe). However, from the 1960s onward, the ideal has been thin, followed by thinner (Byrd-Bredbenner, Murray, & Schlussel, 2005; Wykes & Gunter, 2005). Byrd-Bredbenner et al.'s (2005) analysis of past and more recent fashion trends indicated that the twenty-first century's ideal woman is slim, elongated and almost androgynous.

In this thesis I investigated how images of thin women in the media affected university-aged women (i.e., early 20s), for whom body image is imperative (Mission Australia, 2011). Fifteen-percent of young women are willing to sacrifice 5-years of their lives if they could have a smaller body size (Garner, 1997). Because of the way the mass media depicts thin women,

many young women report that life would improve significantly if they were thinner (Engeln-Maddox, 2006). This belief is because thinness is associated with beauty, success and confidence—thinness expectancies (e.g., Smith, Simmons, Flory, Annus, & Hill, 2007).

The Ideal Body

Fashion and beauty magazines are one of the main broadcasters of ideal-body media images. Several researchers have analysed the changing content of these magazines (Malkin, Wornian, & Chrisler, 1999; Silverstein, Perdue, Peterson, & Kelly, 1986). The body size of the ideal woman portrayed in these magazines has decreased significantly since 1901 (Byrd-Bredbenner et al., 2005; Silverstein et al., 1986; Sypeck, Gray, & Ahrens, 2004). Recently, the women used in these media images were estimated to have an average Body Mass Index[1] (BMI, kg/m^2) of 15 which is considered severely underweight (Dittmar, 2007). Accordingly, I use the term "ideal woman" to refer to underweight fashion models and actresses that feature in popular magazines, advertisements, films and television (ideal-body media; IBM).

In this thesis, I predominantly investigated static advertising images that are commonly used in popular fashion and beauty magazines. The models in these advertisements are unattainably thin and unattainably attractive (Kilbourne, 1994). It is common practice for advertising agencies to alter the models' appearance prior to dissemination (National Advisory Group on Body Image, 2009). Models are often photoshopped/airbrushed to appear, not only thinner, but also more beautiful and flawless than is physically possible (National Advisory Group on Body Image, 2009). It is promising that politicians (e.g., All Party Parliamentary Group (APPG) on Body Image, 2012) have begun advocating for average-weight advertising models and disclaimers on photoshopped images (e.g., this image has been digitally altered). However, the barriers are high, and this progress is slow (e.g., Gillian, 2000)—the ideal woman remains unrealistically thin and beautiful.

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[1] According to the World Health Organisation (WHO) a BMI < 16 is considered severely underweight. Underweight: 16-18.49, Normal-weight: 18.5-24.99, Overweight: 25-29.99, Obese: >= 30.

Because of western overweight/obesity prevalence (Finucane et al., 2011; Flegal, 2005), the discrepancy between the average women's body size and the ideal women's body size is large (Byrd-Bredbenner, et al., 2005; Spitzer, Henderson, & Zivian, 1999). For example, these ideals are smaller than 98% of American women and acquiring this ideal body type is unrealistic for the majority of women (Smolak, 2006). Consequently, body-related comparisons drawn with IBM will often be upward (i.e., comparing to a superior target, see below).

The Effect of IBM-Exposure on Women

Sociocultural theory is the dominant framework used to understand the effects of IBM-exposure on women in Western culture (Levine & Smolak, 1996; Stice, 1994; Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999; Thompson & Stice, 2001). Western cultures are first world cultures that appreciate individualism, competition and thin female bodies (Bordo, 2004). Sociocultural theorists propose that Western society's obsession with an unachievable level of thinness (heightened by the mass media) has contributed to high levels of body dissatisfaction, and problematic eating behaviour[2] among women (Rodin, Silberstein, & Striegel-Moore, 1985; Striegel-Moore, Silberstein, & Rodin, 1986).

The fact that the rise of eating disorders in the West coincided with the decreasing body size of models within IBM is in line with sociocultural theory (Garner, Garfinkel, Schwartz, & Thompson, 1980; Hoek, 1993; Wiseman, Gray, Mosimann, & Ahrens, 1992). Wolf (1991) even considered eating disorders to be sociocultural phenomena. Ashikali and Dittmar (2010) tested sociocultural theory in a sample of blind and sighted women. Compared to blind women who are not bombarded with IBM, sighted women reported heightened dietary restraint and body dissatisfaction (see also Baker, Sivyer, & Towell, 1998). Both dietary restraint and dissatisfaction are risk factors for problematic eating (e.g., Stice, 2001). In addition, sighted women attached more importance to their appearance for self-worth and reported higher awareness and

[2] The term problem/problematic eating is a broad term that I use to include reference to disordered eating symptomatology or behaviour (e.g., bulimia), and non-disordered tendencies or behaviour (e.g., using weight control products such as diet pills or shakes).

internalisation of sociocultural thinness ideals. Awareness and internalisation are distinct characteristics (Thompson, Heinberg et al., 1999). Awareness is knowing that society values thinness and being conscious of the stereotypical thinness expectancies (e.g., success and confidence). In comparison, if participants have internalised the sociocultural stereotype, then they have adopted this norm into their personal belief system and wish to emulate it. Compared with awareness, internalisation is a stronger predictor of participants' body-image disturbance (Cusumano & Thompson, 2001; Thompson, Heinberg et al., 1999). Specifically, internalisation mediates (i.e., accounts for) the relationship between awareness and body dissatisfaction (e.g., Fingeret & Gleaves, 2004; Warren, Gleaves, Cepeda-Benito, Fernandez, & Rodriguez-Ruiz, 2005). Therefore, although Ashikali and Dittmar's research is preliminary, it supports sociocultural theory by highlighting the negative effects visual sociocultural influences (e.g., the mass media) have upon women.

This sociocultural influence is also investigated by comparing Western and non-Western cultures and by studying media-naïve populations before and after the introduction of Western beauty ideals. For example, Warren, Gleaves et al. (2005) tested whether or not participants' ethnicity moderated the pathways between awareness and internalisation and between internalisation and body dissatisfaction. The researchers recruited 300 European American, Mexican American and Spanish women living in the United States and Spain. These three samples of women endorse Western cultural values to varying degrees. Although Mexican American women are likely aware of these Western values, European American women (and Spanish women) are more inclined to internalise these values (Chamorro & Flores-Ortiz, 2000; Gleaves et al., 2000). Consistent with their hypothesis, Warren, Gleaves et al. found that the relationships between awareness and internalisation and between internalisation and body dissatisfaction were strongest among women with strong Western values, the European American participants.

Data gathered by Becker, Burwell, Gilman, Herzog, and Hamburg (2002) provides another example of this sociocultural influence. They conducted a multi-wave cross-sectional study in Fiji, which is a traditional society that values robust body types and has a low prevalence of eating disorders. Becker et al. measured Fijian girls' disordered eating upon the introduction of television (1995) and 3-years after the introduction of television (1998). The group of adolescent girls exposed to television for 3-years reported significantly higher levels of disordered eating and self-induced vomiting.

Mechanisms underlying IBM-effects. To explain the possible mechanisms connecting IBM-exposure and various outcome variables, Stice and his colleagues developed the dual pathway model of bulimic pathology (Stice & Agras, 1998; Stice, Ziemba, Margolis, & Flick, 1996). They based this model upon several independent models. For example, the dual pathway model combines aspects of the sociocultural model, restraint theory (Polivy & Herman, 1985) and affect regulation models (Heatherton & Baumeister, 1991; McCarthy, 1990). According to the dual pathway model, negative outcomes such as body dissatisfaction and disordered eating depend upon the sociocultural pressure (e.g., from family, peers, and the media[3]) participants feel to be thin—participants with a higher BMI feel heightened pressure (Stice, Nemeroff, & Shaw, 1996). In turn, participants' BMI and perceived pressure to be thin both influence their level of thin-ideal internalisation (Stice et al., 1996). Stice (2001) provided prospective support for the dual pathway model. In a sample of adolescent girls, he established that baseline thin-ideal internalisation and sociocultural pressure to be thin predicted participants' subsequent level of body dissatisfaction. In turn, participants' body dissatisfaction triggered negative affect and dieting behaviours. Both negative affect and dieting predicted participants' bulimic symptoms—i.e., the dual pathways (Stice, 2001).

Thin-ideal internalisation. Therefore, in combination with the pressure participants feel to be thin, participants' level of internalisation is a precursor to these negative outcomes. In

[3] As noted previously, the media is the most pervasive medium (e.g., Blowers et al., 2003).

addition to BMI and perceived pressure, there are other predictors of participants' thin-ideal internalisation. For example, participants' level of self-determination predicts internalisation (Pelletier, Dion, & Levesque, 2004). Characteristically, self-determined women are autonomous and intrinsically motivated (Deci & Ryan, 1985; Ryan & Deci, 2000). In theory, such women should consider sociocultural messages relative to their own intrinsic values. For that reason, Pelletier et al. (2004) hypothesised that self-determined women would be indifferent toward sociocultural messages about thinness. Indeed, such women were less inclined to perceive and internalise sociocultural pressures to be thin (Pelletier et al., 2004). Similarly, Twamley and Davis (1999) investigated participants' disregard for social norms and conventions (i.e., nonconformity). Nonconformity moderated—affected the strength/direction of (Baron & Kenny, 1986)—the relationship between participants' awareness of sociocultural ideals and their internalisation of these ideals. The relationship between participants' awareness and internalisation was weaker among participants who reported high, rather than low, levels of nonconformity.

Social comparison. Participants who internalise the thin-ideal stereotype are more likely to use media images as comparison targets (e.g., Dittmar & Howard, 2004). Although not specifically acknowledged in the dual pathway model, internalisation likely affects participants' body dissatisfaction via a social comparison process (Blowers et al., 2003; see also Bessenoff, 2006; Thompson, Coovert, & Stormer, 1999; Tiggemann & McGill, 2004; Tiggemann & Slater, 2004; Tiggemann, Slater, Bury, Hawkins, & Firth, 2012; van den Berg & Thompson, 2007). Within social comparison theory, Festinger (1954) outlines the process of seeking information from others for self-evaluative purposes. Originally, Festinger proposed that individuals only compared themselves with others (i.e., the comparison target) if: (a) another means of objective information was unavailable, and (b) the comparison target was similar on the comparison value/dimension. However, Festinger's theory has undergone several redevelopments (e.g., Kruglanski & Mayseless, 1990; Suls, Martin, & Wheeler, 2002; Wood, 1989). For example,

individuals do draw social comparisons even when objective information is readily available (Marsh & Parker, 1984; Ruble, 1983), and draw comparisons with dissimilar comparison targets if goal relevant (e.g., Martin & Kennedy, 1993; Martin & Kennedy, 1994). It is reasonable to compare with dissimilar targets in order to gain accurate and valuable self-evaluations (Collins, 1996; Kruglanski & Mayseless, 1990).

Indeed, although the prevalence of overweight is high among Western women (Finucane et al., 2011; Flegal, 2005), they commonly draw spontaneous comparisons with underweight models in the media (Smith & Leach, 2004). Because thin models have smaller body-sizes than most women, the comparisons drawn with IBM will generally be upward rather than downward. Upward (downward) comparisons involve comparing to a better-off (worse-off) target. Unlike Festinger's (1954) original self-evaluative theorising, social comparisons can be drawn for self-evaluative, self-improvement (i.e., information gathering) or self-enhancement purposes (Wood, 1989). Depending upon such motives, social comparisons can cause negative, positive or neutral effects (Collins, 2000; Mussweiler & Strack, 2000). Young women usually compare themselves to IBM to self-evaluate or to self-improve, rather than to self-enhance (Martin & Kennedy, 1994). The majority of empirical evidence implies that upward self-evaluative comparisons with models lead to negative contrast effects (Thornton & Moore, 1993) most of the time (Engeln-Maddox, 2005). Halliwell and Dittmar (2005) found that participants reported experiencing heightened body-focused anxiety when they compared themselves to IBM for self-evaluative purposes. In contrast, drawing IBM-comparisons for self-improvement does not trigger body-focused anxiety (Halliwell & Dittmar, 2005; see also Martin & Gentry, 1997).

The Effect of IBM-Exposure on Self-Evaluations and Mood

Evidently, most women cannot achieve the ideal body weight espoused by the media. Therefore, it is unsurprising that 25-50% of women are dissatisfied with their bodies (Bearman, Presnell, Martinez, & Stice, 2006; Stice & Whitenton, 2002). Three groups of researchers report meta-analytic effect sizes ranging from d = -.38 to d = -.28 for the impact of IBM-exposure on

women's body satisfaction (Grabe, Ward, & Hyde, 2008; Groesz, Levine, & Murnen, 2002; Want, 2009). As previously outlined, participants' social comparisons and internalisation of the thin ideal likely trigger this dissatisfaction. A large number of researchers have investigated the effects of IBM-exposure on indices of self-evaluation (e.g., body satisfaction and self-esteem) and mood. A selection of such studies is highlighted below.

Correlational research. Although correlational studies are limited in their causal inferences, they are more naturalistic than experiments. IBM-researchers use correlational studies to investigate associations between participants' self-reported media use and various body-image variables. Generally, participants' media exposure relates negatively to their body image (for exception see Cusumano & Thompson, 1997). For example, Bissell and Zhou (2004) had university women rate their viewing frequency of 40 popular television programs that had been coded for thin-ideal content. Participants' thin-ideal television viewing (e.g., Friends) was related to their body dissatisfaction and drive for thinness (see also Tiggemann & Pickering, 1996). Researchers report similar results for music-video exposure. Music videos characteristically contain thin, scantily clad women (Sommers-Flanagan, Sommers-Flanagan, & Davis, 1993), and depict high levels of sexism and eroticism (Seidman, 1992; Vincent, Davis, & Boruszkowski, 1987). Borzekowski, Robinson, and Killen (2000) found a positive correlation between adolescent girls' music-video exposure and their appearance and weight concerns. Tiggemann and Pickering (1996) reported a comparable correlation between girls' music-video consumption and their self-reported drive for thinness. Magazine exposure is another popular IBM-medium. As with television and music-video exposure, participants' magazine exposure and, for example, body dissatisfaction or self-objectification (i.e., seeing oneself as an object from an outsiders' perspective) correlate positively (Morry & Staska, 2001; Tiggemann, 2003).

Experimental research. As mentioned previously, correlational data cannot determine cause and effect. Maybe women with poor body image choose to expose themselves to IBM, or some third variable might account for the said relationships. In comparison, rather than relying

on self-report, experimental research can better determine whether or not media exposure causes these negative effects. In a typical experimental setting, participants are randomly assigned to view a selection of IBM-images (e.g., magazine or television advertisements) or Control-images (e.g., neutral advertisements). Subsequently, participants will complete a series of outcome measures such as mood and body satisfaction.

As with correlational results, participants who are experimentally exposed to IBM generally report negative self-evaluative and mood effects[4] (for exception see Champion & Furnham, 1999; Myers & Biocca, 1992). In 1990, Irving conducted one of the first experimental IBM-exposure studies. She observed that IBM-exposure (vs. average-weight or overweight models) detrimentally affected women's weight satisfaction and self-esteem. Soon after, Stice and Shaw (1994) conducted a similar study. In comparison to women in the control conditions (average-weight models or neutral images), women in the IBM-condition reported increased negative affect and body dissatisfaction (Stice & Shaw, 1994).

As in correlational research, these negative IBM-effects span across television, music video and magazine exposure. In two studies, Hargreaves and Tiggemann (2003; 2004) reported that IBM-related television commercials negatively affected adolescent girls' body dissatisfaction, negative mood, appearance comparisons and activated appearance schema (a cognitive structure that processes appearance information; Cash & Labarge, 1996). Similarly, experimental exposure to music videos containing thin women increases body dissatisfaction and social comparison tendencies among university women (Tiggemann & Slater, 2004). Experimental exposure to IBM-related magazine images affects women in the same way. Tiggemann and McGill (2004) exposed participants to full-body, body-part or product-only magazine advertisements. Exposure to both full-body and body-part advertisements increased participants' negative mood and body dissatisfaction (see also Birkeland et al., 2005; Hawkins,

[4] Although essential to review this research, it is important to bear in mind that such experimentally-induced negative effects may have been inflated by the presence of demand characteristics (see p. 15 for explanation).

Richards, Granley, & Stein, 2004). As well as affecting mood and satisfaction, IBM-magazine advertisements also increase women's levels of self-objectification and appearance anxiety (Harper & Tiggemann, 2008; Monro & Huon, 2005).

Mediation and moderation. Some correlational and experimental studies have been conducted to explore whether or not certain variables mediated the relationship between IBM-exposure and negative effects. A mediating variable accounts for the relationship between an independent and dependent variable (Baron & Kenny, 1986). A mediation model predicts that the independent variable causes the mediating variable, and that the mediating variable causes the dependent variable. Therefore, the independent variable indirectly causes the dependent variable (Baron & Kenny, 1986).

In line with Stice et al.'s (1996) dual pathway model, thin-ideal internalisation mediates the relationship between IBM-exposure and for example, participants' body dissatisfaction (e.g., Stice, Schupakneuberg, Shaw, & Stein, 1994; Tiggemann, 2003) and self-objectification (Morry & Straska, 2001). Likewise, in two of the aforementioned experiments, Tiggemann and her colleagues manipulated participants' IBM-related social comparisons. In the social comparison (vs. distracter) condition, participants rated statements such as "I would like my body to look like the bodies of the women (if any) in this video clip" (Tiggemann & Slater, 2004, p. 52; see also Tiggemann & McGill, 2004). As Tiggemann and Slater (2004) hypothesised, participants' social comparisons fully mediated the relationship between IBM-exposure and their body dissatisfaction.

Several variables also moderate the relationship between IBM-exposure and negative outcome variables. As previously alluded to, moderating variables affect the strength/direction of the relationship between two or more other variables (Baron & Kenny, 1986). IBM-exposure does not affect all women equally. Some women are vulnerable to experience negative IBM-related effects. Theoretically, IBM-related social comparisons should have more impact upon participants who are invested in their physical appearance (Tesser, 1988). Indeed, Groesz et al.

(2002) and Want (2009) conducted separate meta-analyses and determined that participants with pre-existing appearance concerns are more vulnerable to be negatively affected by IBM-exposure. For example, relative to other participants, body-dissatisfied participants and those who place a high value on their attractiveness (e.g., body-image investment) report more weight concerns, negative affect and body/appearance dissatisfaction in response to IBM-exposure (e.g., Heinberg & Thompson, 1995; Henderson-King, Henderson-King, & Hoffman, 2001; Ip & Jarry, 2008; Posavac, Posavac, & Posavac, 1998; Stice, Spangler, & Agras, 2001). Similarly, in comparison to those who report lower levels, participants who report high levels of public self-consciousness, self-awareness or self-objectification, demonstrate heightened appearance anxiety, lowered self-esteem and lowered attractiveness ratings after IBM-exposure (Monro & Huon, 2005; Thornton & Maurice, 1999; Wilcox & Laird, 2000).

Participants' internalisation levels also moderate the relationships between IBM-exposure and self-evaluative/mood variables. Participants who strongly internalise the thin-ideal stereotype report lower body-image satisfaction and more anger, depression and body-focused anxiety after IBM-exposure (Dittmar & Howard, 2004; Heinberg & Thompson, 1995; Yamamiya, Cash, Melnyk, Posavac, & Posavac, 2005). However, results are mixed. Stice et al. (2001) conducted a longitudinal experiment in which participants were assigned to receive either a 15-month IBM-related magazine subscription or no subscription. The results of this experiment were not consistent with the hypothesised effect. Participants' level of internalisation did not significantly moderate the relationship between viewing IBM-magazines and participants' body image and mood. Perhaps internalisation levels only moderate the relationship between brief IBM-exposure and immediate body satisfaction and mood.

Additionally, Dittmar and Howard (2004) reported that a significant 3-way interaction qualified the significant 2-way interaction they obtained (referenced above) between participants' internalisation and the prime condition variable. The 3-way interaction between participants' internalisation, social comparison tendencies and the prime condition variable

(IBM vs. average-sized models/control) explained an additional 5% of the variance in participants' body-focused anxiety. Perhaps participants' IBM-related self-evaluations or moods might be better understood (and accounted for) by assessing participants' internalisation and social comparison tendencies simultaneously.

Participants' dietary restraint status. In Chapter 2 I include a detailed discussion of dietary restraint. However, restrained eaters—i.e., those who score highly on dietary restraint scales[5]—can loosely be defined as individuals who are consciously attempting to limit their food intake to control their weight (Lowe & Thomas, 2009). It is likely that IBM-exposure negatively affects vulnerable participants (e.g., who have internalised the thin ideal or are invested in their body image) because they value appearance comparisons (Tesser, 1988). Because dietary restraint shares commonalities with the previously discussed vulnerability factors[6], it seems logical that participants' restraint status would also act as a vulnerability factor (i.e., a variable that magnifies negative IBM-effects). In other words, because restrained eaters place a high value on attractiveness (e.g., Spangler, 2002; Spangler & Stice, 2001), they should be particularly vulnerable to experience or internalise the negative sociocultural pressures espoused by IBM. Social-cognitive theorists posit that individuals are primed to gather and process information that is schema relevant (e.g., Hastie, 1980). For instance, participants with pathological eating habits possess orderly cognitive structures related to body image or body parts (Vitousek & Hollon, 1990). Such individuals are more likely to perceive and process body-related information than individuals without these cognitive structures. In reference to similar cognitive schemas, Seddon and Berry (1996) speculated that "…the interpretative world of the restrained

[5] Traditionally restrained eaters were participants who scored above the scales' median (Lowe & Thomas, 2009). However, dietary restraint is better conceptualised as a continuous variable (Lowe & Thomas, 2009; Stein, 1988). Median splits reduce statistical power, increase the probability of making Type 2 errors and increase the chance of misinterpreting interaction effects (Allison, Gorman, & Primavera, 1993; Maxwell & Delany, 1993). Consequently, in this thesis, restrained eaters refer to participants who score highly on the restraint scale in question. Therefore, unrestrained eaters are those who score lower on the scale.

[6] For example, participants' dietary restraint status is related to their thin-ideal internalisation, social comparison tendencies, body-image investment and weight dissatisfaction, see Chapter 2.

eater is coloured by the 'availability' in memory of culturally ideal female stereotypes…" (p. 28). Indeed, recently Jiang and Vartanian (2012) found that restrained eaters processed body-related information (thin and overweight bodies) more proficiently than unrestrained eaters. In turn, theoretically, IBM-exposure should affect restrained eaters negatively, as it affects vulnerable participants with high levels of body-image investment or internalisation—i.e., participants who value attractiveness (e.g., Ip & Jarry, 2008; Yamamiya et al., 2005).

Compared to other vulnerability factors (e.g., thin-ideal internalisation), participants' dietary restraint status has not been studied much in relation to IBM-exposure. Moreover, the few studies that have been done point to positive (e.g., increased self-esteem) or neutral effects, rather than negative effects as hypothesized above. Under the guise of a market research study, Mills, Polivy, Herman, and Tiggemann (2002) randomly assigned participants to view and rate IBM-magazine advertisements, plus-sized body advertisements or product-only advertisements. Restrained eaters reported heightened appearance self-esteem and smaller ideal and current body sizes after IBM-exposure. Viewing IBM seemed to encourage self-enhancement among restrained eaters. Likewise, Joshi, Herman, and Polivy (2004) found that restrained eaters exposed to IBM, rather than Control-magazine images, reported positive self-image and higher social (but not appearance) self-esteem. In addition—although not strictly self-enhancement—Anschutz, Engels, Becker, and van Strien (2008) reported that restrained eaters felt more body dissatisfied after viewing images of average-sized models, compared to viewing thin-body media images. However, unlike other researchers in this area, Anschutz, Engels et al. excluded obese *and* overweight participants. These exclusions make it difficult to compare their findings with other researchers' findings. Therefore, this study was excluded from my literature review.

There are possible explanations for these positive effects among restrained eaters. First, social comparisons can result in positive effects if comparisons are drawn with downward, rather than upward comparison targets (e.g., van den Berg & Thompson, 2007). However, as previously alluded to, because most women have larger body sizes than models do (e.g., Fouts

& Burggraf, 1999; Fouts & Burggraf, 2000), any comparisons drawn with models by restrained eaters will be upward. Therefore, such downward comparisons cannot explain restrained eaters' positive evaluations. Second, upward social comparisons are not always negative. As mentioned previously, unlike upward comparisons motivated by self-evaluation, it is uncommon for self-improvement comparisons to lead to negative effects (Halliwell & Dittmar, 2005). It is possible that participants with different vulnerabilities (e.g., high body-image investment, high levels of restraint) compare themselves with IBM for different reasons. Because restrained eaters are actively trying to lose weight and become thinner, their IBM-comparisons might be motivated by self-improvement rather than self-evaluation, which in turn do not lead to negative effects. In saying that, researchers that have examined social comparison motives have found that comparing with IBM for self-improvement leads to neutral, rather than positive effects (e.g., Halliwell & Dittmar, 2005; Martin & Gentry, 1997). Therefore, this second reason cannot account for restrained eaters' positive IBM-responses either.

Instead of these explanations, Joshi et al. (2004) and Mills et al. (2002) attributed restrained eaters' self-enhancement to thinness fantasising (Myers & Biocca, 1992). Myers and Biocca (1992) used this term to describe the cognitive process mediating between IBM-exposure and self-enhancement. Although hypothesising that IBM would negatively affect participants, the participants in Myers and Biocca's study felt better about themselves after IBM-exposure. Myers and Biocca speculated that such participants "…may have imagined themselves in the ideal body presented by the advertising" (p. 127), in other words they might have fantasised about their own thin bodies. Indeed, Tiggemann, Polivy, and Hargreaves (2009) recently found that experimentally induced fantasy (vs. comparison) processing triggers positive IBM-outcomes.

Based upon Myers and Biocca's (1992) theorising, Mills et al. (2002) reasoned that because thinness is particularly relevant for restrained eaters, IBM served as a motivational mechanism and triggered thinness fantasising (i.e., self-enhancement among restrained eaters).

This self-enhancement effect might explain why some women purchase and enjoy reading fashion and beauty magazines (Thomsen, McCoy, Gustafson, & Williams, 2002).

Nevertheless, given that thinness is relevant for other groups of women also, it is still confusing why the majority of (non-restraint) IBM-researchers report negative effects. Mills et al. (2002) argued that demand characteristics might be partly responsible for the negative effects reported by women in other studies. Demand characteristics are confounds that undermine psychological research (Orne, 1962). Demand characteristics are present in an experiment if participants decipher the experimenters' hypothesis and subsequently behave (perhaps unconsciously) in a hypothesis-supporting manner—the good-subject effect (Nichols & Maner, 2008; see also Weber & Cook, 1972).

Women hold lay beliefs about the negative effects that viewing IBM can have upon their mood, self-esteem and body satisfaction (Garner, 1997; Tiggemann et al., 2000). Consequently, when participants realise that researchers are investigating responses to IBM, participants may be more likely to report negative effects. Mills et al. (2002, Study 3) found that when the purpose of an IBM-related study is obvious, restrained eaters exposed to IBM report feeling depressed. In other words, they reported experiencing a negative contrast effect like vulnerable participants (e.g., body-dissatisfied participants) in other studies. Whereas, when the researchers minimised the demand characteristics, in comparison to unrestrained eaters and participants in the Control-condition, restrained eaters reported the least depression (Mills et al., 2002). This pattern implies that previous researchers might have found positive (vs. negative) self-evaluative/mood effects for participants who place a high value on their attractiveness if demand characteristics had been eliminated (Mills et al., 2002). Indeed, although many of the previously referenced moderator studies included cover stories, contrary to Mills et al.'s suggestions, post-manipulation measures were generally not completed by participants during a second *unrelated* study (e.g., Monro & Huon, 2005; Posavac et al., 1998; Wilcox & Laird, 2000). Consequently, such results may be confounded by demand characteristics.

To my best knowledge, I have identified seven relevant published IBM-papers—including previously reviewed papers by Mills et al. (2002) and Joshi et al. (2004)—in which the researchers investigated the interaction between participants' restraint status and IBM-exposure on self-evaluative or mood outcome variables (Anschutz, Engels, Becker, & van Strien, 2009; Ogden & Mundray, 1996; Seddon & Berry, 1996; Strauss, Doyle, & Kreipe, 1994; Warren, Strauss, Taska, & Sullivan, 2005). However, the results within this small literature are not entirely consistent with Mills et al.'s reasoning. Mills et al. predicted that restrained eaters would only report positive effects when demand characteristics had been stringently controlled for, and would report negative effects when demand characteristics had not been stringently controlled for. However, although some of the research groups controlled for demand characteristics better (e.g., Warren, Strauss et al., 2005) than others (e.g., Ogden & Mundray, 1996), Mills et al. were the only researchers to stringently eliminate demand characteristics by employing a two-study pre-text. Nevertheless, restrained eaters reported either positive (Joshi et al., 2004) or neutral effects (Anschutz, Engels et al., 2009; Ogden & Mundray, 1996; Seddon & Berry, 1996; Strauss et al., 1994; Warren, Strauss et al., 2005) after IBM-exposure. Contrary to Mills et al.'s predictions, although demand characteristics might have been present, in some studies restrained eaters did report positive effects, and in other studies, restrained eaters did not report any statistically significant effects.

In this thesis, three experiments were conducted to investigate the interaction between participants' dietary restraint status and IBM-exposure to predict a variety of self-evaluative and mood variables. Currently the literature is obviously mixed. In Study 1 I tested Mills et al.'s (2002) proposition that restrained eaters will report self-enhancement when there are no demand characteristics in the methodology. It seems confusing that research groups subsequent to Mills et al. who measured participants' dietary restraint status and, although not employing a two-study pre-text, reduced demand characteristics (e.g., enforcing elaborate cover stories, probing/eliminating suspicious participants) and did not find restrained eaters to self-enhance

(e.g., Warren, Strauss et al., 2005). Perhaps previous self-enhancement findings were a coincidence. I investigate this possibility in Study 1.

The Effect of IBM-Exposure on Problematic Eating

As previously reported, endorsement of the sociocultural thinness ideal is also related to problematic eating. Several correlational and experimental studies have been conducted to explore the connections between IBM-exposure and problem eating. In a meta-analytic review of such literature, Grabe et al. (2008) calculated a negative medium-sized effect (d = -.30) of IBM-exposure on women's eating attitudes and beliefs. Because this effect (and mediators/moderators) has already been outlined in some detail, only a small selection of these studies is highlighted below.

Correlational research. Participants' level of IBM-exposure correlates positively with bulimia and anorexia symptomatology (e.g., Bissell & Zhou, 2004; Harrison & Canter, 1997; Morry & Staska, 2001; for exception see Cusumano & Thompson, 1997). Additionally, Thomsen, Weber, and Brown (2002) found a positive relationship between participants' beauty and fashion-magazine exposure and pathogenic dieting behaviours (e.g., taking diet pills, skipping meals, counting calories and intentional vomiting). Similarly, Field et al. (2005) conducted a cross-sectional study and found that girls who wanted to look like the models in IBM-images were likely to use weight and appearance-control products (e.g., protein powder or shakes). Later, this research group completed a longitudinal study and found that adolescent girls' baseline efforts to look like models predicted binge eating at 7-year follow up (Field et al., 2008).

Experimental research. Researchers report similar results when they employ experimental methods. Hawkins et al. (2004) recruited a sample of university women and found that, in comparison to participants exposed to control-magazine images, participants exposed to IBM reported higher anorexia and bulimia related beliefs and perceptions. In a more recent experimental study, Durkin, Rae, and Stritzke (2012) investigated women's ambivalent attitudes

toward chocolate. Chocolate is connected to cravings and binging (Turner, Luszczynska, Warner, & Schwarzer, 2010). Participants were randomly assigned to one of three conditions: thin models advertising chocolate, overweight models advertising chocolate or a no image control. Participants who saw the IBM-images reported increased avoidance, approach and guilt scores from pre- to post-manipulation. In comparison to other studies in this literature review, food-cue exposure confounds this result. However, because ambivalent food attitudes relate to restrained eating and drive for thinness (Urland & Ito, 2005), this study still highlights the effect IBM-exposure can have upon participants' unhealthy food attitudes.

Data obtained within such experiments suggests that IBM-exposure can instantly affect participants' eating (disordered) cognitions. However, Stice et al.'s (2001) longitudinal data indicates that long-term IBM-exposure does not significantly affect girls' bulimic symptoms unless they possess vulnerabilities (see below).

Mediation and moderation. Stice et al. (1994) employed structural equation modelling to investigate the relationship between participants' media exposure and eating disorder symptomatology. The authors found a link between participants' self-reported media consumption (thin-ideal magazines and television) and scores on the Eating Attitude Test (EAT; Garner, Olmsted, Bohr, & Garfinkel, 1982). The EAT is a measure of anorexic and bulimic cognitions, emotions and behaviours. In line with sociocultural theory and the dual pathway model, participants' internalisation and body satisfaction (and gender role endorsement) mediated this link. Specifically, participants' media exposure correlated positively with their sociocultural gender role endorsement (i.e., the importance appearance plays in a woman's gender role), which correlated positively with their thin-ideal internalisation. As previously outlined as part of the dual pathway model, this internalisation predicted body dissatisfaction, which consequently predicted high EAT-scores.

Similarly, Morry and Staska (2001) reported that participants' thin-ideal internalisation mediated the relationship between IBM-exposure and eating disorder symptomatology.

Additionally, Homan's (2010) longitudinal findings suggest that the participants' thin-ideal internalisation predicted increases in restrained eating and exercise behaviours at 7-month follow-up. However, results are mixed. As with participants' self-evaluations (see p. 11), Stice et al. (2001) did not find a statistically significant interaction effect (participants' internalisation levels or body dissatisfaction or pressure to be thin x viewing/not viewing 15-month IBM-magazine subscriptions) to predict participants' dieting or bulimic symptoms. In comparison, participants' social support did significantly moderate the relationship. Participants who received the IBM-subscriptions who had reported low levels of support at Time 1 reported increases in Time 2 dieting and bulimic symptoms (Stice et al., 2001).

The Effect of IBM-Exposure on Immediate Food Intake

It is imperative to understand how IBM-exposure affects participants' eating disorder symptomatology. However, such researchers have relied on self-reported data. It is also important to investigate how these media images instantly affect participants' unhealthy food consumption (if at all). In other words, if unhealthy food is available during or soon after IBM-exposure, do participants eat a lot or a little amount of food? Because previous research has connected IBM-exposure to self-reported problem eating, theoretically participants' actual food intake should be affected by experimental IBM-exposure. Several researchers have conducted experiments to investigate participants' food intake in response to either IBM- or Control-images. Participants' food intake is generally measured after IBM-exposure with a taste-test paradigm (Herman & Mack, 1975; Herman & Polivy, 1975), or participants can snack on food during IBM-exposure (e.g., during a film clip). Results in this area are mixed. Some researchers report that being in different experimental priming conditions does not affect participants' eating behaviour. That is, participants exposed to IBM eat no more or less than participants exposed to Control-images eat (e.g., Anschutz, van Strien, & Engels, 2008; Harrison, Taylor, & Marske, 2006; Jansen & De Vries, 2002; Monro & Houn, 2006; Seddon & Berry, 1996). In comparison, other researchers have found that participants exposed to IBM eat more than

others eat. Both Anschutz, Engels et al. (2009) and Warren, Strauss et al. (2005) exposed participants to a film clip interrupted by IBM-advertisements or Control-advertisements (plus-sized models and/or Neutral-images). Participants snacked on high-calorie foods during the film clip. In comparison to participants exposed to the Control-images, participants who saw the IBM-advertisements consumed more food during the film clip.

Strahan, Spencer, and Zanna (2007) reported different results. Participants memorised a series of television commercials (IBM vs. Control) and then completed a seemingly unrelated taste test. Those exposed to IBM ate less food than those exposed to Control-images ate. Unlike the previously reported studies (e.g., Anschutz, Engels et al., 2009; Warren, Strauss et al. 2005), Strahan et al. controlled for participants' dietary restraint status. Therefore, comparing Strahan et al.'s results to the other researchers' results is difficult. However, a recent study by Krahe and Krause (2010) provides data consistent with Strahan et al.'s findings. Under the guise of a market research study, participants rated a series of magazine advertisements. The advertisements all marketed beauty products and either contained thin or normal-weight models. As reimbursement, participants chose between a diet or non-diet snack. Krahe and Krause found that participants exposed to the thin models chose the diet variant. Although social desirability might have influenced this decision, Krahe and Krause did not control for dietary restraint, and their findings mirror Strahan et al.'s results. Additionally, Brunner and Siegrist (2012) replicated Strahan et al.'s main effect with thin art (vases) rather than IBM. Likewise, Campbell and Mohr (2011) replicated the same main effect using images of underweight/normal-weight women rather than models.

Moderation. As with participants' self-evaluations, IBM-exposure does not affect all women's eating equally. Strahan et al. (2007) included four experiments in the paper referenced above. In addition to the previously reported main effect, this research group also observed that IBM-related food intake could be influenced by challenging participants' sociocultural norms. Half of the participants in the IBM-condition read thought-provoking statements (e.g., "those

models are unrealistically thin") prior to the experimental manipulation (p. 337). These participants ate the same amount of food as participants in the Control-condition ate. In comparison, participants in the IBM-conditions whose norms went unchallenged ate less food. Therefore, in line with previously reviewed theory, participants who had not had their norms challenged and who presumably were aware of the sociocultural norm ate less food than other participants ate.

In a separate study, Harrison et al. (2006) exposed participants to Control-images, or to IBM-images accompanied by either diet/exercise text, irrelevant text, or no text. Participants' ought-discrepancies (i.e., a discrepancy between their actual body and the body they think their peers expect them to have) were also measured. Harrison et al. hypothesised that IBM-exposure should heighten any ought-discrepancies participants held and that consequently such participants should eat less. Indeed, being in different experimental conditions did not significantly affect how much food participants with low discrepancies consumed. Whereas, participants with high discrepancies consumed significantly less food in the IBM-no text condition and in the IBM-diet/exercise text-condition. This result supports the contention that participants with negative body images (i.e., those who believe their body size is discrepant from the body size others believe that they should have) are more affected by IBM-exposure.

Participants' dietary restraint status. Additionally, previous IBM-researchers have found significant differences between restrained and unrestrained eaters' eating. Table 1 contains a summary of all located published papers in which the researchers investigated whether or not participants' dietary restraint status interacted with an experimental prime variable (IBM vs. comparison) to predict food intake. Relative to unrestrained eaters or to restrained eaters in a comparison condition, some researchers have found that restrained eaters

Table 1
Review of Literature: Restrained Eaters' IBM-related Food Intake

Author	Participants	Restraint Scale	Comparison Stimuli	IBM Stimuli	Presentation of and Attention to IBM	Restrained Eaters' Self-evaluation or Mood in the IBM-condition	Type of Food	Restrained Eaters' Food Intake in the IBM-condition
Strauss et al. 1994	86 female undergraduates	RS median split	Neutral/no TV commercial Combined for analyses	TV commercials containing thin models and diet products	Commercial breaks (1.5-minutes) within a sad film	Neither anxiety nor sadness were significantly affected	M&Ms and salted peanuts Total grams analysed	Restrained eaters ate significantly more than restrained eaters in the comparison condition, and more than unrestrained eaters in either condition
Seddon & Berry 1996	74 women from a variety of backgrounds (M_{age}: 25.60)	RS median split	Neutral TV commercials Some contained un-stereotypical women	TV commercials containing thin and attractive models	12-minutes of commercials Participants were told not to memorise irrelevant detail, but that they would answer questions about the commercials	Self-esteem was not significantly affected	Salted peanuts, chocolate peanuts, and savoury snacks Total grams analysed	Restrained eaters ate significantly more than unrestrained eaters Covariate: self-esteem change score
Mills et al. 2002 (Study 1)	98 female undergraduates (M_{age}: 19.72)	RS median split	Plus-sized model advertisements or neutral advertisements	Magazine advertisements containing thin and attractive models	12 laminated full-body advertisements with consumer questions (15-minutes)	Negative affect was not significantly affected Restrained eaters reported higher appearance self-esteem and reported their current body size as smaller	Three flavours of cookies Total grams analysed	Restrained eaters ate significantly more than restrained eaters in the comparison conditions ate Simple slopes were not reported
Warren, Strauss et al. 2005 (Study 1)	91 female high-school students	RS median split	Neutral commercials	TV commercials containing thin models and diet products	Commercial breaks (1.5-minutes) within a sad film	Negative mood was not significantly affected	M&Ms and salted peanuts Total grams analysed	Restrained eaters ate significantly more than restrained eaters in the comparison condition, and more than unrestrained eaters in either condition
Monro & Huon 2006	68 female students	RS	Thin model removed from advertisements	Magazine advertisements containing thin models and body products	2-minutes viewing six advertisements—participants memorised the images for a memory test		Sweet and savoury cookies	No significant effect Covariates: age/BMI
Anschutz, van Strien et al. 2008	124 female students (M_{age}: 21.80) (M_{BMI}: 23.30)	DEBQ-R	Neutral commercials	TV commercials containing thin models and diet products	Commercial breaks (3.5-minutes) within a sad or neutral film		M&Ms and crisps Total caloric intake analysed	Restrained eaters ate significantly less than unrestrained eaters ate Covariates: hunger/overeating
		RS	Neutral commercials		Commercial breaks (3.5-minutes) within a sad or neutral film		M&Ms and crisps Total caloric intake analysed	No significant effect Covariates: hunger/overeating
Anschutz, Engels et al. 2009	110 female students (M_{age}: 20.05) (M_{BMI}: 22.39)	DEBQ-R median split	Plus-sized model commercials or neutral commercials	TV commercials containing thin models	Commercial breaks within a neutral film	Neither sadness, happiness, nor body-focused anxiety were significantly affected	M&Ms and crisps Total caloric intake analysed	No significant effect

consume significantly more food in response to IBM-exposure (Anschutz, Engels et al., 2008[7]; Mills, et al., 2002; Seddon & Berry, 1996; Strauss, et al, 1994; Warren, Strauss et al., 2005).

Strauss et al. (1994) were the first research group to report a link between IBM-exposure and restrained eaters' eating. The researchers exposed participants to a sad film clip with or without commercial breaks. These commercials were either advertising dieting products (which included IBM), or non-dieting products. In addition, participants had M&Ms and peanuts to snack on during the film clip. Strauss et al. originally designed their study to investigate whether or not viewing IBM would reinhibit restrained eaters after exposure to a disinhibitor[8] (milkshake preload). The thin models were expected to remind restrained eaters of their dietary goals, consequently strengthening dietary regulation—reinhibition theory. However, Strauss et al. stumbled upon what they thought would be an inhibitor (the IBM) acting as a disinhibitor. Restrained eaters exposed to IBM ate significantly more snacks than unrestrained eaters, and more than restrained eaters in the other conditions ate.

Seddon and Berry (1996) reported similar effects. That is, viewing IBM triggered restrained eaters to eat significantly more than unrestrained eaters. Similarly, in a later study by Mills et al. (2002), restrained eaters in the IBM-condition ate significantly more high-calorie foods than restrained eaters in the comparison conditions (plus-size models or product-only images). In contrast, unrestrained eaters ate a comparable amount in all three experimental conditions. Furthermore, without giving participants a milkshake preload, Warren, Strauss et al. (2005) replicated Strauss et al.'s (1994) methodology and results. Restrained eaters in the IBM-condition ate significantly more food than unrestrained eaters and more than the restrained eaters in the Neutral-condition ate.

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[7] As mentioned previously, because of their limited range of participants (BMI), Anschutz, Engels et al.'s (2008) study has been excluded from review.

[8] Theoretically, disinhibitors are experiences, feelings or cognitions that disrupt restraint eaters' dietary restraint (Herman & Polivy, 1980). This concept is discussed in Chapter 2.

Perhaps restrained eaters increase their eating after IBM-exposure because they have entered a thinness fantasy (previously outlined). If restrained eaters momentarily feel thin and happy with their bodies, they might feel less need to control their eating, so they eat (Mills et al., 2002). This theory implies that viewing IBM affects restrained eaters' self-evaluation, which in turn affects their eating. However, empirical support for this pathway is limited. To my best knowledge, five research groups have measured participants' dietary restraint status, self-evaluative/mood variables ***and*** food intake (Anschutz, Engels et al., 2009; Mills et al., 2002; Seddon & Berry, 1996; Strauss et al., 1994; Warren, Strauss et al., 2005). However, only Mills et al. (2002) found statistically significant self-evaluative (self-enhancement) effects (see Table 1).

Given the multitude of research connecting restrained eaters' negative affect and negative self-evaluations to their eating (e.g., Ruderman, 1985a; Schotte, Cools & McNally, 1990), some IBM-researchers have speculated that restrained eaters eat more than other participants because restrained eaters have negatively contrasted themselves to the models—a negative contrast explanation (Thornton & Moore, 1993). For example, when negative self-esteem did not significantly mediate the relationship between IBM-exposure and restrained eaters' food intake in the study conducted by Seddon and Berry (1996), they speculated that the relationship might be mediated by restrained eaters' negative mood (also see Strauss et al., 1994). If IBM-exposure negatively affects restrained eaters' self-evaluation or mood, their food intake might be an attempt at affect regulation or distraction. For instance, it is a common conception that eating high-calorie foods repair (or distract one from) negative moods (Tice, Bratslavsky, & Baumeister, 2001). However, as previously detailed, although it seems logical that restrained eaters would experience negative IBM-effects, researchers have not found this significant effect when using experimental methodology[9].

[9] Mills et al. (2002, Study 3) did find such negative effects among restrained eaters. However, this study has not been referenced in the main text because the experiment was purposely ill-designed and included demand characteristics.

More recently, researchers contended whether or not IBM-exposure causes restrained eaters to eat more than other participants. Three research groups have found that viewing IBM has either little effect on restrained eaters' eating behaviour (Anschutz, Engels et al., 2009; Monro & Huon, 2006), or encourages dietary restraint (Anschutz, van Strien et al., 2008). Compared to the four previously reviewed studies, Anschutz and her colleagues used a different restraint scale to identify restrained eaters—the restraint subscale of the Dutch Eating Behaviour Questionnaire (DEBQ-R; van Strien, Frijters, Bergers, & Defares, 1986). In contrast, all the researchers that found restrained eaters to eat more than others following IBM-exposure used the Restraint Scale (RS; Herman & Polivy, 1980). Herman and Polivy (1980) developed the RS alongside restraint theory; however, both their theory and restraint scale have come under criticism for identifying unsuccessful, rather than successful restrained eaters (see Chapter 2). As Anschutz, van Strien et al. (2008) highlighted, it may not be coincidental that restrained eaters identified with the RS eat more than other participants eat in response to IBM-exposure (Mills et al., 2002; Seddon & Berry, 1996; Strauss et al., 1994; Warren, Strauss et al., 2005; for exception see Monro and Huon, 2006) and that those identified with other scales do not (Anschutz, van Strien et al., 2008; Anschutz, Engels et al., 2009).

The Present Studies

Three experiments were conducted to investigate the effects of IBM-exposure on restrained eaters' self-evaluation, mood and eating behaviour. These experiments extend the current literature in several ways. First, survey researchers have reported that, like other Western women, New Zealand women are aware of, and internalise thinness ideals (Miller & Halberstadt, 2005). However, the current research is the first empirical research to assess how IBM-exposure affects young New Zealand women. Second, as mentioned previously, it is unclear whether or not restrained eaters' post-IBM self-enhancement in other studies (Joshi et al., 2004; Mills et al., 2002) is a coincidence or the result of stringent elimination of demand characteristics. By reducing experimental demand characteristics, I sought to clarify this effect in the current set of

studies. Third, in comparison to self-evaluation, mood and problematic eating symptomatology, previous researchers rarely measure participants' immediate IBM-related food intake. This food intake was measured in two of the current studies. Fourth, only five previous research groups have simultaneously measured restrained eaters' self-evaluation/mood *and* food intake. I explored the relationship between these variables in the current experiments. Last, because of the measurement issues surrounding dietary restraint, it is questionable how IBM-exposure affects restrained eaters' eating. To investigate how two very different restraint scales might influence IBM-related results and conclusions, two distinct restraint scales were used throughout this thesis (see Chapter 2).

Chapter 2

Cross-Sectional Analyses

The effect of IBM-exposure on restrained eaters' food intake appears to depend upon the restraint scale used (Chapter 1). I conducted three experiments to investigate how two different restraint scales influenced such results. Participants completed Stice's Dietary Intent Scale (DIS; Stice, 1998; Stice, Fisher, & Lowe, 2004) and the concern for dieting (RS-CD) subscale of the Restraint Scale (RS; Herman & Polivy, 1980). These restraint scales deserve some attention before the experimental results are discussed in Chapters 3-5. In this second chapter, the differences between the RS and the DEBQ-R (restraint scales used by previous IBM-eating researchers) are clarified, and correlates of the two restraint scales (DIS and RS-CD) used in the three current experiments are statistically analysed.

Measuring Dietary Restraint

The intended purpose of restraint scales is to measure participants' dietary restraint and identify weight-loss dieters (e.g., Heatherton, Herman, Polivy, King, & Mcgree, 1988). Consequently, academics use the terms dieter and restrained eater, and dieting and dietary restraint interchangeably. However, these terms are not synonymous. By definition, dieting is "the intentional and sustained restriction of caloric intake for the purpose of reducing body weight or changing body shape, resulting in a significant negative energy balance" (The National Task Force on the Prevention and Treatment of Obesity, 2000, p. 2582). Stice and his colleagues (e.g., Stice, Sysko, Roberto, & Allison, 2010) repeatedly argued that restraint scales do not measure dieting or even restrained eating. Instead, these scales probably identify different types of weight-concerned women who may or may not be dieting. Despite years of research, the exact construct assessed by these restraint scales is a "mystery" (Stice et al., 2004, p. 57).

The Restraint Scale. Herman and his colleagues (Herman & Mack, 1975; Herman & Polivy, 1975; Herman & Polivy, 1980) developed the RS—the most commonly used restraint

scale (Stice, Ozer, & Kees, 1997)—alongside restraint theory. Restraint theory grew from Nisbett's (1972) set point theory (Keesey, 1980). This was the theory that weight suppression caused obese individuals to experience psychological and behavioural problems such as overeating. Because this weight suppression likely surpassed a biological set point (i.e., the point at which the body's weight regulatory mechanisms work to maintain), Nisbett reasoned that weight suppressors were commonly hungry. In turn, this hunger was theorised to trigger problematic tendencies, including overeating (Nisbett, 1972). In comparison, Herman and Polivy (1980) proposed that restrained eaters generally restrain their eating. However, because cognitive restraint is taxing, Herman and Polivy theorised that restrained eaters experience rebound effects/eating in disinhibiting situations. Disinhibitors disrupt dietary inhibition/restraint and include high-calorie preloads, negative affect and cognitive demands[10] (e.g., Herman, Polivy, Lank, & Heatherton, 1987; Polivy, 1976; Polivy & Herman, 1976).

The ten items that make up the RS were intended to identify women who restrict their food intake to suppress their weight (Herman & Polivy, 2008). However, Herman and Polivy (1980) based the conceptual development of the RS upon overweight women with problematic tendencies (i.e., set point theory). Consequently, the scales' validity to measure successful dietary restraint is questionable. The two subscales (Blanchard & Frost, 1983; Lowe, 1984; Overduin & Jansen, 1996) were designed to assess participants' concern for dieting (RS-CD) and weight fluctuations (RS-WF). The RS-CD items refer to general behaviours, for example: "do you eat sensibly in front of others and splurge alone" (response items: ***never, rarely, often, always***). In comparison, the RS-WF items contain questions about specific weight fluctuations, for example: "in a typical week how much does your weight fluctuate" (response items: ***0-1, 1.1-2, 2.1-3, 3.1-5, 5.1+ kg***). These subscales differ markedly. Because Herman and Polivy designed the RS-WF subscale to assess weight fluctuations, it is confounded with participants' weight status (e.g.,

[10] Data gathered by some researchers (e.g., Strauss et al., 1994) implies that IBM acts as a disinhibitor for some restrained eaters (Chapter 1). This is discussed further in subsequent chapters.

Laessle, Tuschl, Kotthaus, & Pirke, 1989; Ruderman, 1985b; Stroebe, 2008). In comparison, unlike participants' RS-WF scores, their RS-CD scores correlate significantly with food intake (Williamson et al., 2007; van Strien, Herman, Engels, Larsen, & van Leeuwe, 2007), emotional eating (Ruderman, 1985a; Williams et al., 2002) and bulimic symptoms (Ruderman, 1985b).

Participants' RS scores predict weight gains and fluctuations (e.g., Klesges, Isbell, & Klesges, 1992; Stice, Cameron, Killen, Hayward, & Taylor, 1999), rather than dietary restraint (e.g., French, Jeffery, & Wing, 1994; Laessle et al., 1989). Therefore, when identifying restrained eaters with the RS, many researchers allege that weight-loss dieting is counterproductive (e.g., Polivy & Herman, 1992). However, as above, the RS items not only tap into restraint, but overeating, emotional eating and weight fluctuations also (van Strien, et al., 2007; Williams et al., 2002; Williamson et al., 2007). In fact, the 10-item RS only contains one obvious restraint-related item. Stice et al. (1997) argued that the scale identifies restrained eaters who consume a high number of calories because the items tap into problem eating (e.g., overeating and emotional eating). In other words, contrary to restraint theory, it may not be dietary restraint that makes restrained eaters vulnerable to overeating. Indeed, removing the overeating and weight fluctuation items from the scale sees the association between participants' RS scores and problematic eating symptomatology reduce (Stice et al., 1997).

The restraint subscale of the Dutch Eating Behaviour Questionnaire. Because of these RS-related criticisms, other academics attempted to develop more credible restraint scales (van Strien, 1999). For example, van Strien et al. (1986) developed the Dutch Eating Behaviour Questionnaire-Restraint (DEBQ-R) to be separate from overeating, emotional eating and weight status. Unlike the RS items, the DEBQ-R items only refer to dietary restraint, not dietary disinhibition (Gorman & Allison, 1995). Empirical evidence suggests that the DEBQ-R does not measure participants' tendency to eat when emotional (Williams et al., 2002) and correlates negatively with participants' self-reported fat, carbohydrate and energy intake (e.g., Anschutz, van Strien, van de Ven, & Engels, 2009).

Van Strien et al. (2007) compared the RS and the DEBQ-R on a variety of measures, including dietary disinhibition, binging, emotional eating, external eating (i.e., eating despite hunger or satiety) and drive for thinness. Although both restraint scores correlated positively with the majority of these measures, in most cases, correlations with participants' RS scores were more pronounced than the correlations with participants' DEBQ-R scores. Furthermore, although correlated positively, Laessle et al. (1989) used factor analysis and established that participants' RS and DEBQ-R scores loaded on separate factors. Participants' RS scores related to disinhibition and weight fluctuation factors, whereas DEBQ-R scores related to successful caloric restriction. Also important, compared to participants' RS scores, their DEBQ-R scores are less likely to predict dietary failure or food intake (e.g., Anschutz, van Strien et al., 2008; Oliver, Wardle, & Gibson, 2000, Stice et al., 1997; van Strien, 1997). Heatherton et al. (1988) acknowledged these differences: "The TFEQ[11] and the DEBQ, by attempting to isolate successful caloric restriction, do not appear to measure the same behavioral tendencies as does the Restraint Scale. They are designed to measure successful dieting, whereas the Restraint Scale is designed to identify dieters" (p. 26)—who, Heatherton et al. added, are generally unsuccessful.

The Dietary Intent Scale. Similar to van Strien et al. (1986), Stice developed the Dietary Intent Scale (DIS) in response to criticisms within the restraint literature (Stice, 1998; Stice et al., 2004). When developing this DIS, Stice took care not to confound the scale with overeating. The DIS is a measure of weight loss and maintenance behaviours and the intention to diet over the previous six months. The DIS items refer to specific behaviours, for example, "I count calories to try to prevent weight gain". Scale items that refer to specific behaviours, rather than global behaviours (like the RS items) have greater predictive power (Klesges, 1984; Schwarz, 1999). This difference in predictive power is because global items are more prone to misinterpretation and, therefore, measurement error (Stice et al., 2004).

[11] Stunkard and Messick (1985) also developed the Three Factor Eating Questionnaire-Restraint (TFEQ-R)/Eating Inventory (EI) in response to the problematic RS. The TREQ-R has not been reviewed here because it has not been used in IBM-research.

Researchers suggest that the DIS and the DEBQ-R are comparable (e.g., Stice, 1998). Stice et al. (2004) conducted a series of studies to test whether or not the three restraint scales in this review (DIS, RS, DEBQ-R) correlated significantly with unobtrusively observed eating. If each scale measures dietary restraint, correlations should be inverse. Unlike participants' RS scores, participants' DIS and DEBQ-R scores correlated negatively with fat-gram intake in a fast food restaurant (Stice et al., 2004, Study 3). In addition, participants' DIS scores (but not their DEBQ-R or RS scores) also correlated negatively with their total caloric intake (Stice et al., 2004, Study 3). However, subsequent research groups did not replicate the significant negative correlation between participants' DIS scores—or DEBQ-R scores (Stice et al., 2010; Sysko, Devlin, Walsh, Zimmerli, & Kissileff, 2007; Williamson et al., 2007)—and unobtrusively observed food intake[12] (Stice et al., 2010; Sysko et al., 2007; Sysko, Walsh, Schebendach, & Wilson, 2005). Although the DIS is not a perfect measure of weight-loss dieting, it appears more valid than the RS. In addition, because the DIS items are less confounded with overeating, the scale is currently one of the better measurement options (Stice et al., 2004).

The Present Studies

Referring back to Chapter 1, restrained eaters seem to eat significantly more than unrestrained eaters after IBM-exposure, but only when restrained eating is measured with the RS (Mills et al., 2002; Seddon & Berry, 1996; Strauss et al., 1994; Warren, Strauss et al., 2005; for exception see Monro & Huon, 2006). When restrained eating is measured with the DEBQ-R, either no significant effect of restraint is found or restrained eaters actually eat significantly less in response to IBM-exposure than unrestrained eaters (Anschutz, Engels et al., 2009; Anschutz, van Strien et al., 2008).

It is suspected that restrained eaters' level of dietary success (i.e., a construct that these different restraint scales tap into differently) is driving the different IBM-eating effects in the

[12] Likewise, correlations between participants' RS scores and unobtrusively observed eating were not significant either (Stice et al., 2004; Stice et al., 2010; Williamson et al., 2007).

literature. To test this idea, I used two different restraint scales throughout the three experiments. Preferably, one restraint scale would identify less successful restrained eaters than the other restraint scale. Ideally, as in previous IBM-research, the DEBQ-R would have been used to identify successful restrained eaters (Anschutz, Engels et al., 2009; Anschutz, van Strien et al., 2008). However, unlike the other restraint scales, the DEBQ is copyright protected and it was unfeasible to purchase the scale to use for 600-700 participants. This barrier was used as an opportunity to investigate the relatively overlooked, but somewhat similar restraint scale, Stice's DIS (Stice, 1998; Stice et al., 2004). In comparison, the RS-CD (concern for dieting) was used to identify less successful restrained eaters. Instead of using the 10-item RS, it is common for contemporary restraint researchers to use the 6-item RS-CD (e.g., Papies & Nicolaije, 2012; Veling, Aarts, & Stroebe, 2011). These researchers report that the RS-CD identifies participants' chronic motivation to control their weight by dieting (e.g., Papies & Nicolaije, 2012). As mentioned previously, in comparison to the total RS or the RS-WF, this RS-CD subscale shows stronger correlations with unsuccessful restraint (i.e., emotional eating and overeating).

In this second chapter, a series of cross-sectional analyses are presented. In comparison to the 10-item RS and the DEBQ-R (i.e., the restraint scales used in previous IBM-research), these restraint scales (DIS and RS-CD) are not as commonly utilised by other researchers. Therefore, it is important to investigate these scales in some detail. The correlations between each restraint scale and a variety of individual-difference/body-image variables are presented here. Participants who have high BMIs or who score highly on measures of weight dissatisfaction, thin-ideal internalisation, body-image investment or social comparison, tend to report negative self-evaluative/mood effects in response to IBM (Chapter 1). It seems logical that restrained eaters would possess such tendencies. Indeed, previous researchers have reported that restrained eaters (DIS and RS) are, for example, body dissatisfied/anxious and internalise the thin-ideal stereotype (e.g., Calogero, 2004; Griffiths et al., 2000; Vartanian, Herman, & Polivy, 2005). Therefore, as discussed in Chapter 1, it is questionable why restrained eaters are

either not significantly affected, or respond positively, rather than negatively to IBM. To aid interpretation of the experimental results in Chapters 3-5, I sought to replicate these previously reported relationships between participants' restraint scores (DIS and RS-CD) and these individual-difference variables. Although participants' scores on different restraint scales predict differential eating styles, different restraint scales generally correlate similarly with body-image variables (e.g., Laessle et al., 1989; van Strien et al., 2007). Therefore, both participants' DIS scores and RS-CD scores should correlate positively with a selection of similar individual-difference variables (Hypothesis 1). These results will help interpret the experimental self-evaluation results in subsequent chapters.

As well as these individual-difference variables, a number of self-reported eating and self-regulatory variables (e.g., cravings and eating expectancies) were also included. In line with previously reviewed research, it was hypothesised that participants' RS-CD scores would correlate highly with indices of unhealthy eating and unsuccessful self-regulation and that such correlations would be weaker when using participants' DIS scores (Hypothesis 2). As discussed, the main intention was to clarify whether or not restrained eaters identified with the RS-CD are relatively less successful restrained eaters than those identified with the DIS. Such clarification will aid interpretation of the experimental results.

Study 1

To evaluate the first hypothesis, measures of participants' BMI, weight satisfaction, social comparison tendencies and body-image investment were included in Study 1. Both restraint scores (DIS and RS-CD) were expected to correlate similarly with these measures (Hypothesis 1). In addition to these individual difference/body image variables, participants' eating expectancies and chocolate cravings and likings were also measured to evaluate Hypothesis 2.

The eating expectancy scale contains five subscales (Hohlstein, Smith, & Atlas, 1998). Hohlstein et al. (1998) designed one of the subscales to assess the expectancy that eating leads to feeling out of control—scores on this expectancy correlate with measures of disinhibition and

inhibition (Boerner, Spillane, Anderson, & Smith, 2004; Hohlstein et al., 1998). The other four subscales were designed to assess whether or not participants use eating as a reinforcer. Two of the subscales assess eating as a negative reinforcer (eating helps manage negative affect and eating alleviates boredom), and two assess eating as a positive reinforcer (eating is pleasurable/a useful reward and eating enhances cognitive competence). These four reinforcing subscales correlate significantly with measures of eating/overeating (Boerner et al., 2004; Fischer, Smith, Anderson, & Flory, 2003; Hohlstein et al., 1998). In line with Hypothesis 2, it was expected that participants' RS-CD scores would correlate positively with the four reinforcing subscales, but that such correlations would be less pronounced when participants' RS-CD scores were replaced with their DIS scores. However, because the 'out of control' subscale relates to measures of disinhibition and inhibition, no specific hypothesis was formulated for this subscale.

Also part of Hypothesis 2, it was anticipated that the two restraint scores would correlate differently with participants' chocolate cravings and likings. Craving high-fat food is associated with overeating, bulimia and obesity (Grilo, Shiffman, & Carter-Campbell, 1994; Mitchell, Hatsukami, Eckert, & Pyle, 1985; Wurtman, 1990). Hill, Weaver, and Blundell (1991) found a link between participants' cravings and their DEBQ emotional and external (but not restrained—i.e., DEBQ-R) eating subscale scores. In comparison, restrained eaters identified with the RS report intense cravings for high-calorie foods (e.g., Fedoroff, Polivy, & Herman, 1997). Therefore, it was hypothesised that compared to the correlations with participants' DIS scores, the correlations between participants' restraint scores and chocolate cravings would be stronger when using participants' RS-CD scores.

In comparison, liking high-fat foods is not significantly related to food intake or weight status (e.g., Cox, Perry, Moore, Vallis, & Mela, 1999). Past researchers reported connections between this liking and low DEBQ-R scores (Wardle et al., 1992), but with high RS scores (Fedoroff et al., 1997; Houben, Roefs, & Jansen, 2010). The items within the DEBQ-R measure successful restraint (van Strien, 1997) and are similar to the DIS items (Stice et al., 2004).

Therefore, the negative correlation between participants' restraint scores and chocolate likings should be more pronounced when analysing their DIS, compared to RS-CD scores.

Correlations consistent with these eating-related hypotheses would reinforce the contention that the RS-CD identifies less successful restrained eaters than the DIS identifies.

Method.

Participants. Female university students were offered $10 NZ or course credit as an incentive to participate in Study 1—a supposed hunger and memory study. One hundred and twenty-two students completed the study. However, participants with a BMI > 30 (n = 7) were excluded from data analysis. Although the RS-CD is less confounded by overweight than the total RS is (Dinkel, Berth, Exner, Rief, & Balck, 2005; Stroebe, 2008), it is common practice to exclude obese participants from restraint-related analyses (Johnson, Lake, & Mahan, 1984; Lowe & Thomas, 2009; Ruderman, 1983). Furthermore, this exclusion criterion is consistent with the experimental analyses[13] (Chapters 3-5). The final sample consisted of 115 participants with a mean age of 22.57 years (SD = 5.68, range 18–54) and mean BMI of 22.89 (SD = 3.22, range 16.67–29.75). Sixty-eight percent of the sample identified themselves as New Zealand European, 8% identified as Chinese, and 4% identified as New Zealand European and New Zealand Māori, and 1% as New Zealand Māori. The remaining 19% of the sample self-identified as other ethnicities (e.g., North American or European).

Procedure. Data for Study 1 were collected in three phases: participants completed an online pre-test questionnaire (Phase 1) 2-weeks before attending an individual session in the laboratory (Phases 2 and 3) which included the experimental manipulation (see Chapter 3 for a detailed description of the procedure). It is important to note that the pre-test questionnaire (Phase 1) came before the experimental manipulation and that the other measures were

[13] Obese women were not included in the main experimental analyses because, compared to participants with lower BMIs, participants with a BMI exceeding 30 (obese) respond significantly differently to anticipatory food intake (Stice, Spoor, Ng, & Zald, 2009) and tasks assessing dietary regulation (Heatherton et al., 1988).

completed after the manipulation. Accordingly, the experimental manipulations' influence on the post-manipulation variables is explored in all of the current correlational analyses.

Measures. Because of copyright restrictions, the scales (and therefore the complete questionnaires) used throughout this thesis cannot be reproduced in their entirety. Sample items from each scale are given as examples. However, with the authors' permission (J. Polivy, personal communication, October 17, 2012; E. Stice, personal communication, October 17, 2012), the DIS and the RS-CD appear in Appendices A and B.

Pre-test questions tapped into participants' restraint status (DIS; Appendix A), social comparison orientation, endorsement of eating expectancies, and weight satisfaction. Later in the laboratory, participants completed measures of chocolate cravings/likings, body-image investment and the RS-CD (Appendix B). At the end of the study, the experimenter weighed participants with a digital scale and recorded their height (BMI).

Dietary restraint. As part of the pre-test questionnaire, participants completed the 9-item DIS (Stice, 1998; Stice et al., 2004). Participants responded to this measure on a 5-point scale, ranging from (1) ***never***, to (5) ***always***. In two separate studies, Stice and his colleagues (Stice, 1998; Stice et al., 2004) found scores on this scale to be internally consistent (Cronbach's α = .93) and temporally reliable (1-month test/retest = .92). Cronbach's α for the present study was .87. Participants also completed Herman and Polivy's 6-item RS-CD subscale in the laboratory. Dinkel et al. (2005) reported good score reliability for this subscale (Cronbach's α = .82). Cronbach's α for the present study was .79.

Body mass index. The experimenter weighed participants and measured their height to calculate their BMI (kg/m^2).

Weight satisfaction. As part of the pre-test questionnaire, participants were asked how dissatisfied they were with their weight (1 = ***not at all dissatisfied*** and 10 = ***very dissatisfied***). This single item was adapted from Heinberg and Thompson's (1995) visual analogue scale. This item was reverse-scored before data analyses so that a higher score indicated greater satisfaction.

Body-image investment. Processing self-evaluative appearance information depends upon appearance self-schemas. Participants completed the 20-item Appearance Schema Inventory-Revised (ASI-R; Cash, Melnyk, & Hrabosky, 2004). This scale measures participants' level of body-image investment—the belief that appearance is important, meaningful and influential. Sample items include "my appearance is responsible for much of what's happened to me in my life" and "when it comes to my physical appearance, I have high standards". Participants responded to each item on a 5-point Likert scale ranging from (1) ***strongly disagree***, to (5) ***strongly agree***. Items include positively and negatively worded items—the negative items were reversed prior to analyses so that a higher score indicated greater investment. Body-image investment is related to thin-ideal internalisation, perfectionist self-presentation, low self-esteem, low body-image quality of life and to problematic eating (Cash et al., 2004). Cash et al. (2004) reported adequate internal consistency for this inventory (Cronbach's $a = .88$). Cronbach's α in the current study was .86.

Social comparison tendency. During the online pre-test questionnaire, participants completed the 11-item Iowa-Netherlands Comparison Orientation Measure (INCOM; Gibbons & Buunk, 1999). This scale includes both positively (e.g., I always pay a lot of attention to how I do things compared with how others do things) and negatively worded items (e.g., I am not the type of person who compares often with others). Participants responded on a 5-point Likert scale, response items ranged from (1) ***strongly disagree***, to (5) ***strongly agree***. Negative items were reversed so that a higher total indicates higher comparison tendencies. High scores are associated with self-consciousness, depressive tendencies and low self-esteem (Gibbons & Buunk, 1999). Gibbons and Buunk (1999) reported adequate temporal stability and good internal consistency among university students (Cronbach's $\alpha = .80$), Cronbach's α in the present study was .79.

Eating expectancies. Participants completed the 34-item Eating Expectancies Inventory (EEI; Hohlstein et al., 1998) online. This inventory contains five—previously reviewed—subscales, comprised of positively (e.g., eating helps me work better) and negatively worded

items (e.g., eating does not make me feel out of control). Participants responded to each item on a 7-point Likert scale ranging from (1) *strongly disagree*, to (7) *strongly agree*. Negative items were reversed prior to analyses, meaning that participants with a high score strongly endorsed these expectancies. Hohlstein et al. (1998) reported high internal consistency estimates for each of the five subscales. In the current study, Cronbach's α for the subscales ranged from .78 to .93.

Craving and liking. Two questions measured chocolate cravings and likings. Participants were first asked: "how much do you like chocolate in general" and response items ranged from (1) *dislike*, to (5) *love*. They were then asked: "over the past month, how often have you experienced a craving for chocolate", response items ranged from (1) *never*, to (5) *always, almost every day*. Craving was defined as an intense desire to consume food that is difficult to resist.

Analyses. In all three studies, I used bivariate (Pearson) correlations to test the relationships between participants' restraint scores and the individual variables[14]. After calculating bivariate correlations, z-tests were conducted to investigate whether or not each pair of correlations differed significantly (i.e., whether or not the correlation between participants' RS-CD scores and the measured variable, e.g., BMI, was significantly different from the correlation between participants' DIS scores and that same variable).

Results. The DIS and the RS-CD correlated highly with each other (r = .70). The correlations between participants' restraint scores and the other variables are displayed in Table 2. There were some similarities between the restraint scales' patterns of correlations. Both correlated negatively with weight satisfaction and positively with body-image investment. In terms of eating expectancies, participants' scores on both restraint scales correlated positively with the expectancies that eating relieves boredom and that eating leads to feeling out of control.

[14] Some of these variables (e.g., craving) were measured after the experimental manipulation. The experimental prime condition variable (Control =1, IBM = 2) did not systematically affect these correlations (see notes Table 2).

Table 2
Correlations between all Variables and Participants' Dietary Restraint Scores in Study 1

	Correlations		**Z-test**
	RS-CD	DIS	Z
BMI	.26**	.15	1.54
Weight Satisfaction	-.48***	-.44***	-0.63
Body-Image Investment[a]	.45***	.39***	0.92
Social Comparison	.29**	.17	1.69
EE Negative Affect	.32***	.16	2.26*
EE Boredom	.30**	.20*	1.42
EE Loss of Control	.61***	.61***	0.01
EE Reward	-.05	-.21*	2.20*
EE Cognitive	-.13	-.25**	1.67
Chocolate Craving[a]	.19*	-.09	3.82***
Chocolate Liking[a]	-.04	-.21*	2.34*

Note. EE = eating expectancy. Z = Stieger's Z-test for correlated correlations within a population.
[a]Variables were measured after the experimental manipulation. After controlling for the experimental condition variable, these correlations were unchanged. Therefore, the bivariate, rather than the partial correlations are presented in the table.
*$p < .05$, **$p < .01$, ***$p < .001$.

There were also distinctions between the two restraint scales. However, as noted, only some of these correlations differed significantly from each other (RS-CD vs. DIS). First, participants' RS-CD scores correlated significantly and positively with BMI, whereas their DIS scores did not. However, these two correlations did not differ significantly (i.e., z-score). Similarly, there were significant positive correlations between participants' RS-CD scores and the tendency to draw social comparisons, the expectancy that eating will reduce negative affect, and chocolate cravings. However, participants' DIS scores did not correlate significantly with these measures. Such correlations concerning participants' eating expectancy and cravings (not social comparisons) significantly differed between their RS-CD and DIS scores. Furthermore, participants' scores on the DIS, rather than the RS-CD, related significantly and inversely to the two positively reinforcing eating expectancies—that eating enhances cognitive competence and that eating is pleasurable and useful as a reward. In saying that, the correlations between participants' DIS and RS-CD scores only differed significantly for the expectancy that eating is

pleasurable and useful as a reward. There was also an inverse correlation between participants' DIS scores and their self-reported chocolate liking. In comparison, their RS-CD scores did not correlate significantly with such liking. This difference (DIS vs. RS-CD) was statistically significant.

Discussion. Consistent with previous research (e.g., Stice et al., 2004; Stice et al., 2010), the restraint scales inter-correlated highly. As hypothesised, both scales were associated with high levels of weight dissatisfaction and body-image investment. However, unexpectedly, only participants' RS-CD scores correlated significantly with higher BMIs and social comparison tendencies. In saying that, the said correlations (restraint and BMI; restraint and social comparison) did not differ significantly between participants' DIS and RS-CD scores. Consequently, the data were primarily consistent with the first hypothesis that the restraint scales would correlate similarly with the individual-difference/body-image variables.

Turning to Hypothesis 2, four positive correlations between the RS-CD and the reinforcing eating expectancies (associated with disinhibition) were hypothesised. Consistent with this hypothesis, in comparison to participants' DIS scores, their RS-CD scores were strongly related to their scores on the 'eating will alleviate negative affect' subscale. It is noteworthy that this subscale is related to disinhibition (Hohlstein et al., 1998). In addition, participants who scored highly on the DIS recorded significantly lower scores on the 'eating is pleasurable and useful as a reward' subscale. Because this expectancy relates to disinhibition (Hohlstein et al., 1998), this finding implies that high DIS scores relate to inhibition. Although there were some deviations, these eating expectancy correlations are consistent with Hypothesis 2. That is, compared to participants' DIS scores, their RS-CD scores related more strongly to indices of unhealthy eating. In saying that, both restraint scores correlated positively with the expectancy that eating leads to feeling out of control. However, it is difficult to interpret such correlations, because past research connects this expectancy with both inhibited and disinhibited eating (Boerner et al., 2004; Hohlstein et al., 1998).

The correlations between participants' restraint scores and their chocolate cravings and likings were also consistent with this second hypothesis. As hypothesised, there was a significant positive correlation between participants' RS-CD scores and cravings, but not between participants' DIS scores and cravings. These two correlations (restraint score and cravings) differed significantly. As previously mentioned, cravings tend to be associated with emotional and external eating, rather than dietary restraint (Hill et al., 1991). These associations imply that the RS-CD would identify relatively less successful restrained eaters than the DIS would identify. Additionally, only participants' DIS scores correlated negatively and significantly with chocolate liking. It is appealing that this correlation replicates previous DEBQ-R research (Wardle et al., 1992), and therefore is consistent with the contention that the DIS and the DEBQ-R identify more successful restrained eaters than the RS-CD does. In other words, participants who score highly on the DIS and the DEBQ-R appear to have contained their liking for chocolate and do not crave it more than participants who score lower on the scale do.

To explore the stability of the obtained correlations, a selection of these variables were reassessed in Study 2. In addition, extra variables were included to test Hypothesis 2 further.

Study 2

Unlike Study 1, participants' body-image investment, social comparison tendencies or eating expectancies were not measured in Study 2. The purpose of Study 2 was to assess the relationship between participants' restraint scores and their BMI, weight satisfaction, chocolate cravings and likings and three new variables. The three new variables were behavioural avoidance tendencies, behavioural approach tendencies and dispositional self-control. As in Study 1, the first hypothesis was that both restraint scores would correlate negatively with participants' weight satisfaction and positively with their BMI. Given Study 1's results, these correlations might be stronger with participants' RS-CD scores. Furthermore, the second hypothesis was that participants' RS-CD scores would correlate more highly with their frequent chocolate cravings

(positive correlation); whereas, participants' DIS scores would correlate more highly with their infrequent chocolate likings (negative correlation).

The three new variables were also used to test Hypothesis 2. First, having low self-control is associated with problematic dietary control (e.g., Peluso, Ricciardelli, & Williams, 1999). Therefore, the hypothesis was that the negative correlation between participants' restraint and self-control scores would be stronger for participants' RS-CD, compared to DIS scores. This finding would be consistent with the second hypothesis that participants' RS-CD scores would correlate highly with indices of unhealthy eating and poor self-regulation.

Second, Gray (1977; 1981; 1990) theorised that trait anxiety and trait impulsivity underlie individual differences in avoidance and approach sensitivities. Individuals with heightened behavioural avoidance systems respond to threatening or anxiety provoking cues (e.g., possible punishment or intense/novel stimuli) with negative affect. Consequently, these individuals work to avoid anxious experiences. Therefore, this system inhibits behaviour that may result in more upsetting or harmful consequences. In contrast, the behavioural approach system encourages goal-directed behaviour and regulates appetitive motives. This system is responsive to cues for reward and nonpunishment or escape from punishment. Individuals with a heightened approach system are motivated to approach appetitive cues (e.g., rewards and fun) because they experience a high amount of positive affect in response to such cues.

Tapping into these tendencies might provide additional information about each restraint scale. Recently, researchers reported significant positive correlations between participants' avoidance tendencies and poor diet and physical inactivity (e.g., Voigt et al., 2009). Similarly, participants' approach tendencies correlate significantly with problematic eating tendencies (binge eating, DEBQ-emotional eating, DEBQ-external eating) and preferences for unhealthy foods (Davis et al., 2007). In line with Hypothesis 2, compared to participants' DIS scores, their RS-CD should correlate strongly with their approach and avoidance tendencies.

Method.

Participants. Participants responded to emails and posters advertising a study on female task performance and personality. Three-hundred and ten female university students completed the current study in exchange for a $10 NZ voucher or course credit. As in Study 1, participants whose BMI exceeded 30 (n = 20) were excluded from analyses. The final sample consisted of 290 female participants with a mean age of 20.84 (SD = 5.28, range 16–52) and mean BMI of 23.02 (SD = 2.89, range 16.00–29.97). Seventy-six percent of the sample identified themselves as New Zealand European, 5% as New Zealand European and New Zealand Māori, 3% as Chinese, 2% as New Zealand Māori and the remaining 14% as other ethnicities (e.g., Australian, Indian).

Procedure. Once again, this procedure was primarily designed for experimental purposes, and more detail can be found in Chapter 4. Participants were tested individually in the laboratory. After the experimental manipulation, participants worked through the self-report scales in the booklet. Because all the self-report scales were completed post-manipulation—as in Study 1—the bivariate correlations were also tested after controlling for the experimental prime condition variable (see notes Table 3).

Measures. The scales tapped into participants' weight satisfaction, restraint status (DIS and RS-CD), dispositional self-control, approach and avoidance sensitivity, and chocolate likings and cravings. After participants completed this battery of questions, the experimenter weighed them and measured their height.

Dietary restraint. As in Study 1, participants completed the DIS (present study Cronbach's α = .84) and the RS-CD (present study Cronbach's α = .73).

Body mass index. Again, participants' BMI was calculated (kg/m^2) with their weight and height measurements that were recorded by the experimenter.

Weight satisfaction. Participants rated how satisfied they were with their weight, (1 = *not at all satisfied* and 10 = *very satisfied*). A higher score indicated greater satisfaction.

Behavioural avoidance and approach. Participants completed Carver and White's (1994) 20-item behavioural avoidance and approach scale. Four subscales tap into participants' avoidance and approach tendencies (Carver & White, 1994). Upon developing and validating the scales, Carver and White reported adequate internal consistency for the scale. Participants rated each item from (1) *very true*, to (4) *very false*. All necessary items were reversed prior to analyses so that a higher score indicated high avoidance or approach sensitivity. There are seven BIS items (e.g., I worry about making mistakes) that tap into the likelihood of experiencing threat-induced anxiety—inhibition or avoidance sensitivity. Cronbach's α for the current sample was .77. In comparison, three separate subscales assess approach sensitivity: Drive (I go out of my way to get things I want), Fun Seeking (I often act on the spur of the moment), and Reward Responsiveness (When I get something I want, I feel excited and energised). In the current study, these three subscales were summed to form a total BAS scale (e.g., Davis et al., 2007); Cronbach's α was .80.

Dispositional self-control. Self-control was assessed with Tangney, Baumeister, and Boone's (2004) 13-item self-control scale. As part of the scales' initial development Tangney et al. reported good internal consistency (α = .83) and test-retest reliability for the scale (Cronbach's α in the current study = .81). Items were assessed with a 5-point Likert scale (1 = *not at all like me*, 5 = *very much like me*) and included positively (I am good at resisting temptation) and negatively worded items (I say inappropriate things). Negatively worded items were reverse scored, meaning that a high score indicates higher self-control. Low self-control scores relate to indices of problem eating, problem drinking, poor psychological adjustment and low self-esteem (Tangney et al., 2004).

Chocolate cravings and likings. Participants completed the same craving and liking questions that were used in Study 1.

Analyses. As in Study 1, bivariate correlations were used to investigate the hypotheses, and z-tests were used to examine the statistical differences between the two restraint scores. The

majority of the variables measured in Study 2 were measured after the experimental manipulation. Therefore, as in Study 1, the experimental prime condition variables[15] were controlled for in a set of additional correlations (see note Table 3).

Results. The correlations for Study 2 are presented in Table 3. As in Study 1, participants' DIS and RS-CD scores correlated highly (r = .71). However, in comparison to Study 1, some of the relationships among participants' restraint scores and the variables were not the same in this second study. In Study 2, participants' BMI (positive correlation), weight satisfaction and dispositional self-control (negative correlations) correlated significantly with both their RS-CD and DIS scores. In comparison, participants' restraint scores did not correlate significantly with their behavioural approach tendencies. Similarly, although the correlations did differ significantly between the two measures of restraint, neither restraint score correlated significantly with participants' chocolate likings.

Table 3
Correlations between all Variables and Participants' Dietary Restraint Scores in Study 2

	Correlations		**Z-test**
	RS-CD	DIS	Z
BMI	.16**	.18**	-0.45
Weight Satisfaction	-.49***	-.47***	-0.52
Avoidance Sensitivity	.25***	.14*	2.50*
Approach Sensitivity	.09	.05	0.89
Self-Control	-.15*	-.15*	0.01
Chocolate Craving	.29***	.14*	3.43***
Chocolate Liking	.03	-.06	2.00*

Note. Z = Stieger's Z-test for correlated correlations within a population.
All variables were measured after the experimental manipulation. After controlling for the experimental condition variables, these correlations were unchanged. Therefore, the bivariate, rather than the partial correlations are presented in the table.
*p < .05, **p < .01, ***p < .001.

[15] Unlike Study 1, because there were three conditions in Study 2, two dummy codes (West, Aiken, & Krull, 1996) were constructed to define the priming conditions and control for any possible influence the manipulation had upon the correlations. Dummy 1 contrasted the IBM-condition to the Control-condition, whereas Dummy 2 contrasted the IBM-condition to the Neutral-condition.

There were two significant differences between participants' restraint scores. Although both scores correlated positively and significantly with participants' behavioural avoidance tendencies and chocolate cravings, z-tests showed that these correlations were significantly stronger for participants' RS-CD scores.

Discussion. As in Study 1, in Study 2 I hypothesised that the restraint scales would correlate similarly with participants' BMI and weight satisfaction (Hypothesis 1). Indeed, the obtained correlations were consistent with Hypothesis 1. Conversely, it was expected that the correlations between participants' restraint scores and their low dispositional self-control, high approach and avoidance sensitivities and frequent chocolate cravings and likings would be stronger for participants' RS-CD, compared to DIS scores (Hypothesis 2). The data were not entirely consistent with Hypothesis 2. That is, neither restraint score correlated significantly with participants' chocolate likings or approach sensitivities, whereas both scores correlated negatively with participants' dispositional self-control. In saying that, the positive correlations between participants' avoidance sensitivities and chocolate cravings were significantly stronger for their RS-CD compared to DIS scores. These two variables (avoidance sensitivity and cravings) are associated with unhealthy eating (Hill et al., 1991; Voigt et al., 2009). Consequently, the data in Study 2 partially suggested that the relationship between restraint and these unhealthy variables was stronger for participants' RS-CD. The obtained correlations varied between Studies 1 and 2. Therefore, in Study 3 I included all Study 2 variables and a number of additional variables (specific to dietary intake/control) to further investigate the pattern of correlations.

Study 3

As in Studies 1 and 2, participants in Study 3 had their height and weight (BMI) measured by the experimenter and completed measures of their weight satisfaction, avoidance/approach sensitivity, social comparison tendencies, dispositional self-control and craving/liking. The new measures assessed participants' implicit self-esteem, thin-ideal internalisation, locus of control, self-regulatory success in dieting and unhealthy/healthy eating

behaviours. Again, it was hypothesised that both restraint scores would correlate similarly (Hypothesis 1) with the various individual-difference/body-image variables (e.g., high thin-ideal internalisation, high social comparison and low self-esteem), but distinctly with any eating, self-control and weight-related variables (Hypothesis 2). Specifically, compared with their DIS scores, participants' RS-CD scores were hypothesised to correlate more highly with frequent high-calorie cravings/likings, unhealthy food intake, external/low locus of control, low dispositional self-control, low perceived self-regulatory success in dieting.

In terms of these new variables, by analysing participants' implicit self-esteem and thin-ideal internalisation, an aim was to investigate the breadth of Hypothesis 1, and whether or not restrained eaters possess similar vulnerabilities as other women who are vulnerable to negative IBM-effects (e.g., Heinberg & Thompson, 1995; Henderson-King et al., 2001; Ip & Jarry, 2008; Posavac et al., 1998; Stice et al., 2001). Furthermore, because both restraint scores were similarly related to participants' dispositional self-control in Study 2, more specific measures (healthy/unhealthy eating questions and a brief perceived self-regulatory success in dieting scale) were included in Study 3. These measures allowed for more detailed testing of Hypothesis 2.

The locus of control scale was included for similar reasons. Individuals with an internal (or high) locus of control believe that events are dependent upon their own behaviour. In comparison, participants with an external (or low) locus of control believe that life events depend upon luck and/or powerful others (Handler, Hynes, & Nease, Jr, 1997). A low locus of control is associated with feelings of helplessness and low self-efficacy (Judge, Erez, Bono, & Thoresen, 2002). It will be valuable to know if different restraint scores relate differently to participants' self-efficacy. However, primarily, this measure was included as another indicator of dietary success. First, Nir and Neumann (1995) found that possessing a low locus of control predicted unsuccessful weight loss. Second, continual failure in a technically controllable domain (e.g., dieting) should lead to feelings of helplessness (McCarthy, 1990). Therefore, if the RS-CD (and not the DIS) is related to repeat dieting failures, participants with high RS-CD scores should

report a low locus of control, an inverse correlation. In line with Hypothesis 2, this correlation between participants' locus of control scores and their restraint scores should be lower when analysed with participants' RS-CD, rather than DIS scores.

Method.

Participants. Female participants were recruited via the university's psychology participant pool and via email advertisements sent around other university departments. The current study was advertised as a personality and sensory awareness study (e.g., sight and taste). Participants were offered $10 NZ or course credit to complete the study. Although 249 participants completed this study, 26 participants with a BMI greater than 30 were excluded from data analyses. The final sample consisted of 223 participants with a mean age of 20.75 (*SD* = 6.74, range 17–59) and a mean BMI of 23.17 (*SD* = 2.95, range 15.05–29.51). Seventy-nine percent of the sample identified themselves as New Zealand European, 5% as New Zealand European and New Zealand Māori, 4% as Chinese and the remaining 12% of participants were other ethnicities (e.g., North American).

Procedure. As in Studies 1 and 2, the procedure was designed for experimental purposes. Further detail can be found in Chapter 5. Similar to Study 1, Study 3 was divided into pre- and post-experimental manipulation measures. Again, partial correlations were used to test whether or not being in different experimental priming conditions affected the bivariate correlations between participants' restraint scores and the variables measured post-manipulation (see notes Table 4).

Measures. During the pre-test, participants completed the DIS, the RS-CD, and measures of their weight satisfaction, implicit self-esteem, liking and craving of high-calorie foods, social comparison tendencies and locus of control.

Two-weeks later, participants completed the experiment in the laboratory. After the manipulation, they completed a questionnaire assessing their self-regulatory success, dispositional

self-control, approach/avoidance sensitivities, thin-ideal internalisation and eating behaviours. At the end of the study, the experimenter weighed participants and measured their height.

Dietary restraint status. Participants completed both the DIS and the RS-CD (respectively, current study Cronbach's α's = .89 and .81).

Body mass index. As in Studies 1 and 2, the experimenter recorded participants' height and weight. These measures were used to calculate their BMI (kg/m^2).

Weight satisfaction. To measure self-esteem, participants rated their weight satisfaction on the same 10-point scale used in Study 2. Therefore, a higher score indicated greater satisfaction.

Implicit self-esteem. To measure self-esteem, participants indicated how much they liked their entire name (e.g., first and last) on a 9-point scale, 1 = ***not at all***, 9 = ***very much*** (Gebauer, Riketta, Broemer, & Maio, 2008). This measure is based upon the idea that, the more people like their names, the more they like themselves. Gebauer et al. (2008) found this item to have high test-retest reliability, to be unaffected by impression management and to relate positively and significantly (*r*s ranged from .30 to .38) to explicitly measured self-esteem (e.g., Self-Esteem Scale, Robins, Hendin, & Trzesniewski, 2001; Self-Liking/Self-Competence Scale-Revised, Tafarodi & Swann, 2001).

Behavioural inhibition and approach. As in Study 2, participants completed Carver and White's (1994) BIS/BAS scales. In the current study Cronbach's α for the BIS scale was .76, and .97 for the composite measure of the three BAS scales.

Thin-ideal internalisation. New to Study 3, participants completed a measure of thin-ideal internalisation. Although the Sociocultural Attitudes Towards Appearance Scale-3 (Thompson, van den Berg, Roehrig, Guarda, & Heinberg, 2004) contains four subscales, participants only completed the internalisation-general subscale. This subscale measures the endorsement of the thin-ideal stereotype projected by the media. Participants rated nine items (e.g., I wish I looked like the models in music videos) on a 5-point Likert scale (1 = ***definitely***

disagree, 5 = *definitely agree*). High internalisation scores correlate with measures of body dissatisfaction, drive for thinness and eating pathology (e.g., Forbes, Jobe, & Revak, 2006; Thompson et al., 2004). Thompson et al. (2004) reported high internal consistency across two studies for this subscale (average r = .94). Cronbach's α in the current sample was .92.

Social comparison tendency. As in Study 1, participants completed the INCOM (Gibbons & Buunk, 1999). Cronbach's α in the current study was .74.

Dispositional self-control. Participants completed the same 13-item scale (Tangney et al., 2004) that was used in Study 2. Cronbach's α for the present sample was .83.

Locus of control. Participants' locus of control was measured with Sapp and Harrod's (1993) 9-item brief version of Levenson's (1974) 24-item Locus of Control scale. This 9-item scale comprises three subscales: internal control, control by powerful others, and control by chance. Participants rated each item on a 7-point scale (1 = *strongly disagree*, and 7 = *strongly agree*). All 6-items on the powerful others and chance scales were reversed prior to analyses. Therefore, high scores indicate internal (or high) locus of control (e.g., my life is determined by my own actions). Sapp and Harrod found acceptable score reliability and construct validity for this scale. Cronbach's α in the current study was .74.

Craving and liking. These two questions were similar to those used previously. However, unlike the items used in Studies 1 and 2, the items in Study 3 referred to high-calorie foods, not chocolate.

Perceived self-regulatory success in dieting. This 3-item scale was developed by Fishbach, Friedman, and Kruglanski (2003). Meule, Papies, and Kubler (2012) reviewed relevant literature and found a positive relationship between participants' scores on this scale and their dietary success. Participants rate the items (e.g., how successful are you in watching your weight) on a 7-point scale (1 = *not*, 7 = *very*). Cronbach's α for the present study was .66. Although scales with few items have low α-levels (Carmines & Zeller, 1979) and .66 is comparable to other

research (e.g., van Koningsbruggen, Stroebe, & Aarts, 2011)[16], this low Cronbach's α is a limitation of this measure.

Eating behaviour. Five items measured participants' healthy and unhealthy eating behaviour (e.g., Baker, Little, & Brownell, 2003; Kuijer & Boyce, 2012). Participants recorded how many days of the week they: ate junk food (e.g., potato chips), fast food (e.g., hamburger), or overate (e.g., kept eating while they were already full). The five response items ranged from '*every day*' to '*less than once a week*'. These three items (average $r = .24$, ps $< .05$) were combined to form one unhealthy intake variable. Cronbach's α in the present study was .64. This item was reversed—a higher score indicates more days per week. Participants' healthy food intake was also assessed with two items. Participants recorded how many servings of fruit and vegetables (separate items) they ate on a typical day. Five response items ranged from *'less than one serving a day'* to *'4 or more servings a day'*. As with the unhealthy intake variable, these two items ($r = .25$, $p < .001$) were combined to form one variable (Cronbach's $\alpha = .40$). Because both the unhealthy- and healthy-intake variables were comprised of a low number of items, their internal consistency estimates are low and caution was used while interpreting relevant correlations.

Analyses. As in Studies 1 and 2, bivariate correlations were used to test the hypotheses[17] and z-tests were employed to test for differences between participants' two restraint scores.

Results. The correlations are in Table 4. As in Studies 1 and 2, participants' restraint scores correlated positively with each other ($r = .67$). Akin to previous results, there were similarities between the scales pattern of correlations. Both restraint scores correlated positively with participants' BMI and social comparison tendencies, and negatively with their weight

[16] Since conducting the current study, the scale has been re-developed to include 'non-applicable' response options for non weight-concerned participants (Meule et al., 2012). Upon analysing four datasets, Meule et al. (2012) noted that participants in past studies likely chose the middle rating (i.e., 4) if the item was non applicable and, therefore, that the original scale (used in the current study) is reliable.

[17] As in the other studies, some variables (e.g., self-control) were measured after the experimental manipulation. As can be seen in Table 4, the experimental prime condition variable (Neutral =1, IBM = 2) did not significantly alter these correlations.

satisfaction. New to Study 3, participants scoring higher on either restraint scale also reported greater thin-ideal internalisation. Nevertheless, although both restraint scores correlated significantly with such measures, the correlations between restraint and weight satisfaction (negative correlation), thin-ideal internalisation and social comparison tendencies (positive correlations) were stronger when using participants' RS-CD, rather than DIS scores. Last, neither restraint score correlated significantly with participants' implicit self-esteem, approach sensitivities, high-calorie food liking or self-reported healthy food intake.

Table 4
Correlations between all Variables and Participants' Dietary Restraint Scores in Study 3

	Correlations		**Z-test**
	RS-CD	DIS	Z
BMI	.26***	.24***	0.38
Weight Satisfaction	-.62***	-.48***	-3.19***
Implicit Self-Esteem	-.06	-.01	-0.92
Avoidance Sensitivity[a]	.13	.09	0.74
Approach Sensitivity[a]	.01	.04	-0.55
Thin-Ideal Internalisation[a]	.47***	.37***	2.05*
Social Comparison	.34***	.22**	2.30*
Self-Control[a]	-.15*	-.03	-2.20*
Locus of Control	-.19**	-.10	-1.66
High-Calorie Craving	.27***	.09	3.35***
High-Calorie Liking	.08	-.06	2.58*
Self-Regulatory Success[a]	-.22**	-.03	-3.50***
Unhealthy Food Intake[a]	.14*	-.07	3.83***
Healthy Food Intake[a]	.11	.02	1.65

Note. Z = Stieger's Z-test for correlated correlations within a population.
[a]Variables were measured after the experimental manipulation. After controlling for the experimental condition variable, these correlations were unchanged. Therefore, the bivariate, rather than the partial correlations are presented in the table.
*$p < .05$, **$p < .01$, ***$p < .001$.

As in previous studies, compared with participants who scored highly on the DIS, those who scored highly on the RS-CD reported significantly more frequent high-calorie food cravings. Unlike Study 2, only participants' RS-CD scores correlated negatively and significantly with participants' dispositional self-control. This correlation was significantly stronger than the

nonsignificant correlation between participants' DIS scores and their dispositional self-control. New to Study 3, participants' RS-CD (but not DIS) scores were significantly associated with a low locus of control, poor self-regulatory success and frequent unhealthy eating behaviours (e.g., overeating, fast food intake). However, the differences between participants' RS-CD and DIS scores were only statistically significant for the self-regulatory success and unhealthy-eating variables (i.e., not locus of control). As noted, the unhealthy-eating variable had low internal consistency and by itself should not be given too much credence. However, the obtained correlation between this variable and participants' RS-CD scores was similar (strength and direction) to those correlations obtained with similar variables (e.g., craving and self-control).

Discussion. As in Studies 1 and 2, it was hypothesised that participants' DIS and RS-CD scores would both correlate similarly with the negative body-image and individual-difference variables. Indeed, data were consistent with this hypothesis. Regardless of the scale, participants with higher restraint scores had higher BMIs, thin-ideal internalisation, social comparison tendencies and lower weight satisfaction. In saying that, the correlations between restraint score and weight dissatisfaction, thin-ideal internalisation and social comparison tendencies were significantly stronger for participants' RS-CD scores.

It was also hypothesised that, the correlations between participants' restraint scores and variables related to unhealthy eating (e.g., low self-control and frequent cravings) and unsuccessful weight-loss (e.g., low locus of control) would be stronger when calculated with participants' RS-CD, rather than DIS scores. The majority of the correlations were consistent with this second hypothesis. For example, compared to participants' DIS scores, their RS-CD scores correlated more strongly with their food cravings, unhealthy eating behaviours (positive correlations), self-regulatory success and self-control (negative correlations). It is clear that the RS-CD relates to a wider variety of unhealthy variables than the DIS does.

Combined Discussion

I conducted these cross-sectional analyses for two reasons. The first goal was to investigate whether or not participants' restraint scores (DIS and RS-CD) correlated similarly with several individual-difference and body-image variables. The second overriding goal was—before interpreting the experimental results—to clarify that, as suggested by previous researchers (e.g., Stice et al., 2004), the RS-CD identifies relatively less successful restrained eaters than the DIS identifies.

There were similarities between the two restraint scales, and the differences between the two scales showed some inconsistency between studies. Overall, however, the data patterns were partially consistent with both of the hypotheses. On average, both restraint scores were associated with negative characteristics (e.g., weight dissatisfaction, high levels of thin-ideal internalisation, social comparison tendencies and body-image investment). In addition, compared to participants' DIS scores, their RS-CD scores showed stronger correlations with self-control and eating-related variables that are negative. For example, participants scoring high on the RS-CD were more inclined to expect eating to reduce negative affect and to perceive their self-regulatory success to be low.

Summary. As previously mentioned, the RS has been the most commonly used measure of restrained eating (Stice et al., 1997). When using the RS, many researchers generalise that dieters and/or restrained eaters are overeaters, self-regulatory failures, crave high-calorie foods or eat to regulate negative affect (e.g., Polivy & Herman, 1999). However, a number of these negative characteristics showed stronger correlations with participants' RS-CD, rather than DIS scores. Therefore, between-study comparisons about restrained eaters identified with different restraint scales need reinterpretation.

Although this reinterpretation applies to a wide variety of literature, it also applies to previous IBM-eating literature. Previous IBM-eating researchers have drawn inconsistent conclusions about restrained eaters' IBM-related food intake. In an attempt to clarify these

inconsistencies, my three experiments (Chapters 3-5) needed to be accompanied by two different restraint scales. Indeed, the current correlational results highlight a variety of distinctions between the restrained eaters that each scale identifies. Strictly speaking, the correlations did not indicate that participants' DIS scores correlated with "successful" variables (e.g., self-control, healthy eating, self-regulatory success). Nevertheless, consistent with existing research (e.g., Stice et al., 2004) and Hypothesis 2, restrained eaters identified with the RS-CD appear to be less successful restrained eaters than those identified with the DIS.

Chapter 3

Study 1 Experimental Analyses

In this first experiment, I investigated restrained eaters' self-evaluation, mood and eating behaviour after IBM-exposure. In Chapter 1, other studies with similar purposes were reviewed. As discussed, previous IBM-researchers have found inconsistent results regarding self-evaluation and eating behaviour among restrained eaters. However, previous research has been limited in a number of ways.

First, Mills et al. (2002) argued that participants in previous (non-restraint) research reported negative IBM-effects (e.g., weight dissatisfaction) because they believed IBM-exposure was meant to affect them negatively. As mentioned previously, this amenable behaviour is common in psychological research and is attributable to demand characteristics—in particular the good-subject effect (Nichols & Maner, 2008). Following Mills et al.'s suggestion, to minimise demand characteristics, I manipulated IBM-exposure in the main study, whereas the explicit outcome variables were measured in a second *unrelated* study. In addition, an implicit rather than explicit mood measurement was employed. Implicit measures are less vulnerable to demand characteristics (Greenwald et al., 2002). Previous researchers have tested whether or not participants' restraint status interacts with IBM-exposure to predict their explicit mood; it does not (Anschutz, Engels et al., 2009; Mills et al., 2002). However, this interaction has not been tested with an implicit measure. Because implicit effects occur beyond conscious awareness, explicit and implicit measures tap into different parts of self-knowledge (De Houwer & Moors, 2007). Therefore, even if participants were explicitly asked about IBM-mood effects, they may not have access to such implicit knowledge (i.e., introspective limits; Greenwald et al., 2002). It is also possible that restrained eaters psychologically defend against negative IBM-effects. Restrained eaters have likely made repeated unsuccessful attempts (via dieting) to emulate the thin ideal. Therefore, compared to unrestrained eaters, restrained eaters might feel more psychological defensiveness about the media's negative effects, and consequently do not report

negative mood when it is measured explicitly. In turn, perhaps IBM affects restrained eaters' mood implicitly, rather than explicitly.

Second, the effects of IBM-exposure on restrained eaters' food intake depend upon the restraint scale used. As outlined in Chapter 1, participants who score highly on measures of more successful restraint (e.g., DEBQ-R), tend to restrain their eating in response to IBM-exposure (e.g., Anschutz, van Strien et al., 2008), whereas participants who score highly on measures of unsuccessful restraint (e.g., RS) do not (e.g., Strauss et al., 1994). Unlike other IBM-researchers, Anschutz, van Strien et al. (2008) measured participants' restraint status with multiple measures, the DEBQ-R and the RS. Anschutz van Strien et al. observed that the interaction between participants' DEBQ-R scores and the priming condition variable (IBM vs. Neutral commercials) significantly predicted their food intake. Specifically, restrained eaters exposed to IBM restrained their food intake. This interaction effect remained statistically significant after controlling for participants' overeating tendencies[18]. As an exploratory analysis, Anschutz, van Strien et al. checked whether or not the significant interaction replicated when the RS replaced the DEBQ-R as the measure of dietary restraint status. This interaction effect (RS score x experimental prime condition variable) was not statistically significant after controlling for participants overeating tendencies[19]. Unlike restrained eaters (RS) in previous IBM-studies (e.g., Strauss et al., 1994), the restrained eaters (RS) in Anschutz, van Strien et al.'s study did not eat significantly more than other participants ate in response to IBM-exposure. Because overeating tendencies were entered as a covariate, this finding reinforces the contention that only unsuccessful restrained eaters (i.e., those with overeating tendencies) will consume more food than other participants in response to IBM-exposure (Mills et al., 2002; Seddon & Berry, 1996; Strauss et al., 1994; Warren, Strauss et al., 2005).

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[18] This was a composite measure of participants' emotional eating, external eating and bulimia scores (Anschutz, van Strien et al., 2008).

[19] Unlike the DEBQ-R regression analyses, Anschutz, van Strien et al. (2008) did not report the RS regression analyses *without* controlling for participants' overeating tendencies.

In this current study, restrained eaters' eating behaviour was measured after IBM-exposure. Restrained eaters were identified with two different restraint scales—the RS-CD and the DIS. In Chapter 2, several correlational analyses demonstrated that the RS-CD identifies less successful restrained eaters than the DIS identifies. Some might consider Anschutz, van Strien et al. (2008) to have already compared restrained eaters' IBM-related eating when identified with two separate restraint scales. However, because Anschutz, van Strien et al. controlled for participants' overeating tendencies, such an analysis was not a direct comparison between restraint scales. More importantly, it was not a direct comparison between a measure of unsuccessful restrained eating and more successful restrained eating.

The Present Study

In Chapter 1, two explanations for the effects of IBM on restrained eaters were discussed: the thinness fantasy effect and the negative contrast effect. Each explanation contains a self-evaluative component and an eating component. To recap, advocates of the thinness fantasy effect hypothesise that restrained eaters fantasise about their own thinness after IBM-exposure and then eat because they feel thin (e.g., Mills et al., 2002). In contrast, advocates of the negative contrast effect hypothesise that restrained eaters negatively contrast themselves to IBM and then eat to regulate this negative affect (e.g., Seddon & Berry, 1996).

Self-evaluation and mood effects. Both the RS-CD and the DIS identify women with similar self-evaluations, who are invested in their body image and report similar social comparison tendencies (see Chapter 2). For this reason, it was hypothesised that viewing IBM would affect unsuccessful (RS-CD) and successful (DIS) restrained eaters' mood or weight satisfaction similarly. However, it was questionable whether such effects would be positive (thinness fantasy) or negative (negative contrast).

Although the effects might be exaggerated by the presence of demand characteristics, previous researchers find that the majority of women report feeling negative after IBM-exposure (Chapter 1). This negative contrast effect appears to be magnified among vulnerable women

(e.g., weight-dissatisfied women; Posavac et al., 1998). However, previous researchers have not found significant negative self-evaluative or mood effects among restrained eaters. To recap, some research groups have not found any significant self-evaluative/mood effects (e.g., Anschutz, Engels et al., 2009; Seddon & Berry, 1996), and some have found statistically significant positive effects (Joshi et al., 2004; Mills et al., 2002). As previously mentioned, Mills et al. (2002) contended that—when the demand characteristics are stringently controlled for—IBM-exposure triggers self-enhancement (i.e., thinness fantasising) among restrained, but not unrestrained eaters. Mills et al. speculated that, compared to unrestrained eaters, restrained eaters were more likely to fantasise about thinness because they were actively trying to be thinner and were more attuned to the thinness ideal. However, because participants with similar vulnerabilities (e.g., weight dissatisfaction) respond negatively to IBM, in Chapter 1 I questioned whether or not Joshi et al.'s (2004) and Mills et al.'s significant self-enhancement effects might be coincidental.

Therefore, following Mills et al. (2002), I explored whether or not restrained eaters would self-enhance when demand characteristics had been stringently controlled for. Self-enhancement would mean that restrained eaters exposed to IBM reported lower negative mood, higher positive mood and more weight satisfaction than unrestrained eaters and participants in the Control-condition. These results would be consistent with the self-evaluative component of the thinness fantasy effect. However, it is also possible that restrained eaters negatively contrast themselves to IBM as other vulnerable subsets of women appear to do (e.g., Posavac et al., 1998). In this case, restrained eaters in the IBM-condition would report negative mood and weight dissatisfaction.

Eating effects. In line with the thinness fantasy effect, Mills et al. (2002) speculated that restrained eaters indulge after IBM-exposure because they feel thin. However, perhaps restrained eaters (RS) in previous research eat, not because they feel good about their bodies, but because they tend to eat when tempted by high-calorie foods (i.e., during a taste test) and/or when

emotionally aroused (i.e., by IBM). This contention is reinforced by researchers who use alternative restraint scales (i.e., not the RS) and do not replicate this significant IBM-eating effect (e.g., Anschutz, van Strien et al., 2008). In Chapter 2 I reported that the DIS and RS-CD tap into similar self-evaluative and body-image characteristics, but that the RS-CD is more related to unhealthy/unsuccessful eating behaviours and cognitions (e.g., eating expectancies and perceived dietary regulation). Therefore, regardless of the (positive or negative) self-evaluative results and the absence of demand characteristics, it was hypothesised that unsuccessful restrained eaters (RS-CD) would eat significantly more than other participants would eat after IBM-exposure, but that successful restrained eaters (DIS) would not. This result would suggest that IBM-exposure only encourages restrained eaters' food consumption if they are prone to overeating and emotional eating (i.e., an unsuccessful restrained eater), not if they are successful at dietary regulation.

Summary. Young women's DIS and RS-CD scores relate similarly with measures of body dissatisfaction (e.g., Calogero, 2004; Griffiths et al., 2000). However, compared with RS scores, DIS scores show stronger associations with behavioural dietary restraint (Stice et al., 2004). Such patterns were reinforced by the results of my cross-sectional analyses presented in Chapter 2. Therefore, in conjunction with previous IBM-research, it was hypothesised that the two separate restraint scales would predict different IBM-eating responses, but would not predict different IBM-related self-evaluation and mood responses.

Specifically, it was hypothesised that, over and above any main effects, participants' restraint status and the experimental condition would interact to explain an additional significant amount of variance in participants' mood and weight satisfaction. Compared to unrestrained eaters, restrained eaters were expected to report either significant positive *or* negative effects after IBM-exposure. Positive (negative) effects would be consistent with the thinness fantasy (negative contrast) effect. Next, this interaction effect (restraint score x experimental prime condition) was hypothesised to predict unsuccessful restrained eaters' (RS-CD) food intake in a

taste test. Particularly, unsuccessful restrained eaters (RS-CD) in the IBM-condition were expected to eat significantly more food than other participants would eat. Conversely, successful restrained eaters (DIS) exposed to IBM were hypothesised to eat no more (i.e., a similar amount or a significantly smaller amount) than the other participants would eat.

Method

Participants. Potential participants responded to flyers that were placed around the university. The flyers advertised that women were needed for a study on hunger and memory (cover story). An incentive of $10 NZ reimbursement or psychology course credit was advertised to complete an online questionnaire (Phase 1) and memory tasks in the laboratory (Phase 2). One hundred and forty-six women completed Phase 1, with 122 going on to complete Phase 2 two-weeks later[20].

As in the cross-sectional analyses (Chapter 2), seven obese women (BMI > 30) were not included in the main data analyses for a few reasons. First, this exclusion is common for restraint-related analyses (Lowe & Thomas, 2009). Second, previous researchers have found that obese women react differently to experimental manipulations assessing self-regulation (Heatherton et al., 1988) and that they respond differently to anticipatory food intake (Stice et al., 2009). Additional exclusions were made for these experimental analyses. Because minimising demand characteristics was a main purpose of the study, participants were probed for suspicion during the debriefing session. Therefore, those who connected the two *separate* studies ($n = 5$)[21] were eliminated prior to data analyses. Also, because previous IBM-researchers have focused on female university students and because appearance anxiety (Tiggemann & Lynch, 2001) and

[20] There was no difference between the participants who continued past Phase 1 in terms of restraint status (DIS), $t(144) = .88$, $p = .40$, $\eta^2 = .01$. However, participants who did not continue to Phases 2 and 3 ($M = 4.10$, $SD = 2.31$) were less satisfied with their weight than those who did continue ($M = 5.99$, $SD = 2.58$) past Phase 1, $t(144) = 3.10$, $p < .01$, $\eta^2 = .06$. Nevertheless, because participants were randomly assigned to the experimental conditions in Phase 2 and there were no differences between participants assigned to the IBM- and Control-condition (Table 6), this attrition should not have affected one group more than the other.

[21] As will become apparent, this number differs in magnitude from Studies 2 and 3. Unlike Studies 2 and 3, the experimenter did not take detailed notes to code participants' level of suspicion in Study 1. In other words, participants were only coded as connecting the two unrelated studies ($n = 5$), or not connecting the studies. This was a limitation, and participants' level of suspicion (and this connection) was coded in Studies 2 and 3.

IBM-effects (Groesz et al., 2002) decrease with age, middle-aged (40-64yrs) participants were also excluded from the main data analysis (n = 3). Consequently, the final sample consisted of 107 women (9% Psychology students), with a mean age of 21.92 (SD = 3.90, range 18-37). Participants were randomly assigned to the experimental conditions. However, after the elimination of suspicious participants, compared to the Control-condition (n = 56), the IBM-condition contained 51 participants. At the conclusion of each student's participation, the experimenter measured their height and weight (M_{BMI} = 22.89, SD_{BMI} = 3.18, range 16.67-29.75). Sixty-six-percent of the sample identified themselves as New Zealand European, 8% as Chinese, 4% as New Zealand European and New Zealand Māori, 1% as New Zealand Māori and the remaining 21% as other ethnicities (e.g., European). There were no statistically significant differences between participants in the IBM-condition and the Control-condition in terms of age, BMI, pre-manipulation weight satisfaction and restraint status (Table 5).

Table 5
Between-Condition Comparisons on Individual Difference Measures in Study 1

	Control		IBM		df	t	p	η^2
	Mean	**SD**	**Mean**	**SD**				
Age	22.55	4.27	21.22	3.34	105	1.79	.08	.03
BMI	23.14	3.23	22.61	3.14	105	0.85	.40	.01
Pre. Weight Sat.	5.02	4.76	4.76	2.75	105	0.50	.62	.00
Restraint (RS-CD)[a]	8.59	3.44	7.63	3.70	105	1.39	.17	.02
Restraint (DIS)	2.37	0.88	2.08	0.79	105	1.81	.07	.03

[a]Participants completed this measure after the experimental manipulation and outcome measures.

Procedure. The current study received approval from the appropriate Human Ethics Committee (HEC 2008/80; Appendix C). Data were collected in three phases: Phase 1 was an online pre-test questionnaire, Phase 2 was a supposed hunger and memory study (including the

experimental manipulation and assessment of implicit mood) and Phase 3 was an ostensibly *unrelated* study that contained all of the outcome measures (except implicit mood).

Phase 1. To avoid priming participants that I was primarily investigating body image and eating, their restraint status (DIS) and pre-manipulation weight satisfaction were measured online 2-weeks prior to Phases 2 and 3. Participants thought that the questionnaire was part of a larger study investigating how hunger affects memory (see Appendix D for information sheet and consent form). As well as the DIS and weight satisfaction, participants completed questions[22] about their memory capabilities (fillers), general concentration levels (fillers) and other hunger-related behaviours (fillers). At the conclusion of this questionnaire (10-15 minutes), the participants arranged a time to complete Phase 2 in the laboratory.

Phase 2. The experimenter ran participants individually in the laboratory. Participants were seated at a desk and provided with an informed consent and information sheet (Appendix E). This sheet explained that in addition to the hunger and memory study they had signed up for (Phase 2), they could also participate in an unrelated study on body and taste perceptions (Phase 3) for a $2 scratch and win voucher. If they expressed interest in this unrelated study, they were given an additional consent form to complete (Appendix F). Following completion of both consent forms they were provided with the questionnaire booklet for the memory study (Phase 2). Here, they completed measures of their demographics, memory, concentration (filler items), hunger, and the first measure of implicit mood (dependent variable) disguised as a memory test.

Once participants completed this first mood measurement they were shown one of two PowerPoint presentations—i.e., the experimental manipulation described below—and completed an associated memory test. This test was a fake assessment of how the participants' self-reported level of hunger affected their memory. Participants then completed the second measure of implicit mood.

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[22] As outlined in Chapter 2, the pre-test also included measures of participants' social comparison tendencies and eating expectancy endorsement.

Phase 3. Next, participants completed the additional unrelated study on body and taste perceptions. Participants recorded their post-manipulation weight satisfaction and then began the taste test[23]. For this taste test, the participants were given two pre-weighed bowls of crispy and original M&Ms. Participants rated both types of M&Ms on various taste dimensions (e.g., salty, sweet). After the taste test (10-minutes), participants completed a final sheet of questions that contained the RS-CD[24]. The experimenter then informed participants that both studies were complete, weighed the participants and measured their height.

Finally, the experimenter provided participants with a debriefing sheet (Appendix G) that explained the study and the use of deception. The experimenter then questioned each participant to ascertain whether or not they were aware that the two studies were related[25]. The experimenter coded participants who connected the two unrelated studies. Participants were thanked, reimbursed for their time and asked not to discuss the experiment with other students or possible participants. After the conclusion of each session, the experimenter weighed the remaining M&Ms in each bowl.

Manipulation. The experimental manipulation was based upon the manipulation developed by Monro and Huon (2006). In each condition, participants watched a Microsoft Office PowerPoint presentation of seven static advertisements taken from popular women's magazines. Participants were randomly assigned to view either five thin and attractive models advertising products such as perfume or make-up and two neutral filler images (IBM-condition, see Appendix H for an example), or the same seven advertisements with the thin and attractive models digitally removed from the five IBM-images (Control-condition, see Appendix I for an

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[23] In line with the cover story (hunger and memory), participants were asked not to eat for at least 2-hours prior to arriving at the laboratory. This ensured that all participants would be willing to eat something during the experiment (e.g., Strahan et al., 2007).

[24] Questions were also included that measured participants' chocolate cravings/likings and their body-image investment (Chapter 2).

[25] The fact that probing occurred after debriefing is a limitation of Study 1 and was remedied in Studies 2 and 3. This method may have encouraged participants to indicate that they had connected the two unrelated studies (i.e., that the deception had not worked). This does not appear to have occurred, as only five participants reported connecting the two studies.

example). Each advertisement was displayed for 20 s before the slide automatically changed (see instructions in Appendix J). To ensure participants paid attention to the slideshow, they were instructed to take in as much detail as possible for a pending memory test (Appendices K and L).

Measures. Participants completed scales assessing their restraint status, weight satisfaction and hunger levels. Their BMI, implicit mood and food intake were also measured.

Dietary restraint status. Participants' restraint status was measured with two separate scales. During the pre-test, participants completed Stice's (1998) 9-item Dietary Intent Scale (Cronbach's α for this present sample was .88). This scale measured participants' successful dietary restraint (see Chapter 2). Second, at the conclusion of the study, participants completed Polivy and Herman's (1980) 6-item RS-CD as a measure of unsuccessful restraint (Cronbach's α for this present sample was .88). As mentioned, both scales are reproduced in Appendices A and B with the authors' permission (J. Polivy, personal communication, October 17, 2012; E. Stice, personal communication, October 17, 2012).

Body mass index. At the end of the study, the experimenter weighed participants with a digital scale and recorded their height with a wall chart. Participants' BMI was calculated kg/m^2.

Weight satisfaction. Participants' weight satisfaction was measured during Phases 1 (pre-test questionnaire) and 3 (post-manipulation). Participants responded to the question "how dissatisfied are you with your weight" on a 10-point scale ranging from (1) *not at all dissatisfied*, to (10) *very dissatisfied* (adapted from Heinberg & Thompson, 1995). This item was reversed prior to data analyses so that a higher score indicated greater satisfaction.

Implicit mood. In an effort to minimise demand characteristics, a validated computer task was used to assess participants' pre- and post-manipulation (both completed during Phase 2) implicit mood (Hass, Katz, Rizzo, Bailey, and Moore, 1992; see also Koole, Smeets, van Knippenberg, & Dijksterhuis, 1999; Twenge, Catanese, & Baumeister, 2003). Hass et al. (1992) based the conceptual development of the task on Schwarz and Clore's (1988) model about using feelings as information. The tasks' instructions are worded to encourage participants to allow

their subconscious to assign meaning to nonsense words. As with many projective tests, Hass et al. reasoned that participants should use their current mood as information during the task, information that will be reflected in their response choices (see below). To validate this measure, Hass et al. experimentally manipulated participants' mood and found that those assigned to the negative mood induction felt more negatively (as evidenced by the implicit test) than those assigned to the control condition felt.

In this task, participants are briefly (20 ms) presented with a word that is then masked by a string of Xs. Following each of these trials, participants are presented with a response list containing four words. Their task is to choose the word that has just been flashed on the computer screen. Prior to beginning the task, participants are told that 20 ms is too brief for any participant to recognise the word but that their subconscious should be able to perceive the word and recognise it in the response list. They are also told that their responses would be guided by their subconscious, so that guessing is normal. In the present study, this task was presented as an investigation of how hunger influences the ability to remember details presented outside conscious awareness.

In reality, each target word that was flashed on the computer screen was an ambiguous nonsense word and each response list contained an emotive option and three filler options (e.g., GLOVE, GLOBE, GLOSS, GLOOM). All emotive words were drawn from Hass et al.'s (1992) study. The task consisted of 18 trials pre-manipulation and 18 trials post-manipulation (Appendices M and N). In eight trials, the emotive word in the response list was positive, and in another eight trials, the emotive word was negative. The two other trials were filler trials and did not contain an emotive word. Participants' selection of an emotive word (either positive or negative) is considered a reflection of their current mood. The percentage of negative and positive words chosen by participants was used as an index of their negative or positive moods. For example, if four of the possible eight negative options were chosen, the score would be .50.

Hunger. Participants rated their hunger at the beginning of Phase 2 (pre-manipulation). This measure was disguised as part of the cover story. Participants rated this hunger on a 7-point scale ranging from (1) *not hungry at all*, to (7) *extremely hungry*.

Food intake. Participants' food consumption was measured with a taste test during Phase 3 (Appendix O). Participants were provided with one large bowl of crispy M&Ms and one large bowl of chocolate M&Ms. A professional balance was used to measure the M&Ms before and after each participant's taste test. Participants were instructed to taste and rate the M&Ms in the order presented (crispy, followed by chocolate) and to have a drink of water in between rating each bowl. Participants rated (e.g., these crispy M&Ms are sweet) the M&Ms on 7-point scales ranging from 1 = *certainly not*, to 7 = *certainly yes*. After rating both types of M&Ms, participants were then required to make a comparison between the two types of M&Ms and explain which type they preferred and why. This was an effort to increase participants' consumption. To encourage food intake, participants were told that, for hygiene reasons the bowls of M&Ms would not be used for other participants. Participants were left alone for 10-minutes and were encouraged to help themselves to the M&Ms if they finished the ratings early. After each session, chocolate and crispy bowls were weighed separately by the experimenter and these weights were then combined to form a total intake variable.

Analyses. Initial descriptive and correlational analyses were conducted first. Second, hierarchical multiple regression (HMR) analyses (using SPSS GLM) with homogeneity of slopes tests were used to examine whether or not any statistically significant main or interaction effects (restraint variable x experimental prime variable) predicted the four dependent variables (positive mood, negative mood, weight satisfaction, food intake[26]). These tests were conducted twice, once with participants' RS-CD scores as the measure of restraint, and once with their DIS scores. Where appropriate, pre-manipulation statistics (covariates) were controlled for in the appropriate

[26] These four variables were not normally distributed (all Kolmogorov-Smirnov tests $p < .05$). However, this violation is common among large samples and is not considered problematic if the sample size is greater than 30 (Gravetter & Wallnau, 2000).

tests (e.g., pre-manipulation positive mood). Adequate statistical power (90%) was achieved to detect medium interaction effects with alpha set at .05 (Faul, Erdfelder, Buchner, & Lang, 2009). Because dichotomising continuous scales reduces statistical power and effect size estimates and increases the chance of making Type 2 errors (Maxwell & Delaney, 1993; Whisman & McClelland, 2005), I kept both restraint scales as continuous measures rather than dividing the scales at their medians. To investigate whether or not any statistically significant main (prime condition variable or restraint variable) or interaction effects (prime condition variable x restraint variable) were present in the data set, each separate variable was regressed upon each dependent variable in a stepwise fashion. Therefore, the two groups of four HMR analyses consisted of multiple steps. The predictor variables were entered into the model as follows: (1) any covariates (e.g., pre-manipulation positive mood for the dependent variable post-manipulation positive mood), (2) experimental prime condition variable, (3) dietary restraint status variable (RS-CD or DIS scores) and (4) the interaction variable. A moderator effect is present if this interaction variable accounts for a significant amount of the variance in the dependent variables. Therefore, if participants' restraint status moderates the relationship between the dependent variable and the experimental condition variable, then R^2 will significantly increase between the final two steps in the model and the statistics (e.g., *F*-value) in the final step will reach significance (Baron & Kenny, 1986). Cohen (1992) specified that increments in R^2 of .02 or more indicate unique input toward the variance accounted for in the dependent variable(s) and should be explored. Main effects that were qualified by a statistically significant interaction between the prime variable and restraint in the final step of the model were then explored by constructing simple slopes (Sibley, 2008) one standard deviation above and below the mean of restraint (West et al., 1996).

Results

Preliminary analyses. Means, standard deviations and correlations between all the variables in the study are presented in Table 6. The correlations between participants' age, BMI

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Table 6
Correlation Matrix and Descriptive Statistics for all Study 1 Variables

		1	2	3	4	5	6	7	8	9	10	11
1	Restraint (RS-CD)											
2	Restraint (DIS)	.73***										
3	Age	-.02	-.05									
4	BMI	.24*	.15	.01								
5	Pre Pos. Mood	.09	-.06	.03	-.04							
6	Post Pos. Mood	-.12	-.09	-.01	-.03	.08						
7	Pre Neg. Mood	-.03	-.09	.02	.19†	.08	-.17†					
8	Post Neg. Mood	.10	-.02	-.11	.08	.16	-.06	.10				
9	Pre Weight-sat.	-.50***	-.50***	.07	-.45***	.02	.10	-.13	-.03			
10	Post Weight-sat.	-.60***	-.49***	.07	-.56***	.01	.16	-.09	-.27**	.68***		
11	Food Intake[a]	-.05	-.04	-.15	.14	-.05	-.05	.19†	.10	-.14	-.07	
	M	8.13	20.10	21.92	22.89	0.30	0.35	0.28	0.21	6.10	6.06	42.56
	SD	3.58	7.59	3.90	3.18	0.18	0.16	0.17	0.14	2.61	2.42	25.89

[a]Participants' hunger rating has been controlled for in the correlations with participants' food intake.
†$p < .10$, *$p < .05$, **$p < .01$, ***$p < .001$

and the other variables are discussed first. If participants' age or BMI correlated significantly with the dependent variables, they were entered as covariates in the main analyses.

As can be seen in Table 6, participants' age did not correlate significantly with the other variables. Therefore, age was not used as a covariate in any of the main analyses. The correlations further showed that participants' BMI correlated negatively and significantly with their pre and post-manipulation weight satisfaction. However, in order to avoid collinearity, because BMI and pre-manipulation weight satisfaction were highly correlated, only pre-manipulation weight satisfaction was entered as a covariate in the HMR analyses with post-manipulation weight satisfaction as the dependent variable (Stevens, 1996).

There were only a small number of correlations between pre- and post-manipulation measures. Neither pre-manipulation mood measure (i.e., positive or negative) correlated significantly with participants' post-manipulation mood. However, pre- and post-manipulation weight satisfaction correlated highly with each other. The majority of the correlations (main effects) involving participants' DIS or RS-CD scores are presented in the subsequent sections below. However, similar to the cross-sectional analyses[27], the two restraint scores correlated highly and participants' RS-CD scores correlated positively with their BMI. Second, there were significant negative correlations between both measures of participants' restraint status and their pre-manipulation weight satisfaction.

There were three other noteworthy correlations. Participants' post-manipulation weight satisfaction correlated negatively with post-manipulation negative mood. Last, although these two correlations were marginally significant, participants with higher levels of negative mood prior to the experimental manipulation recorded lower levels of positive mood post-manipulation and ate more M&Ms during the taste test.

[27] Because additional participants (e.g., suspicious participants) were excluded from the experimental analyses presented in this chapter, the correlations between participants' restraint scores and the other variables are comparable, but not identical to the correlations reported in Chapter 2 for Study 1.

Main analyses. Next, the data were analysed with two groups (RS-CD and DIS) of four HMR analyses (using SPSS GLM). Relevant assumptions (e.g., absence of outliers and normally distributed residuals) were checked for all eight models (Pallant, 2005). In all analyses (Chapters 3-5), outliers were defined as datum points more than three standardised residuals from the regression line (Newton & Rudestam, 1999). However, these cases were only considered problematic if their Cooks Distance was greater than one (Tabachnick & Fidell, 2001). This was not the case in any regression analyses presented in this chapter. Minimal violations of the other assumptions occurred, but are discussed where appropriate.

In addition, variance inflation factor (VIF) and tolerance statistics were examined to test for the presence or absence of multicollinearity between the interaction variable and the two predictor variables involved within the interaction (i.e., experimental prime condition variable x dietary restraint status). Multicollinearity is present if the VIF > 10, or the tolerance value < .10 (Bowerman & O'Connell, 1990). If present, the analyses were conducted with centred interaction variables[28] (West et al., 1996).

A between-condition breakdown of the descriptive statistics for the dependent variables can be seen in Table 7. Both Tables 8 and 9 on the following pages contain the HMR results. For the purpose of examining the hypothesised interaction effect, statistics in Tables 8 and 9 are final (interaction) step statistics. However, to facilitate understanding of any main effects, the R^2 change values (i.e., how much additional variance in the dependent variable each predictor variable explains when the effects of the previously entered predictor variables have been controlled for) are presented for each step. Before commenting on any influence the experimental prime condition variable had upon the dependent variables it is necessary to note that the there were no statistically significant interaction effects between any of the covariates

[28] Some researchers do not advocate mean-centering as a valuable solution to issues of multicollinearity (e.g., Echambadi & Hass, 2007). However, as will become apparent in the proceeding sections, mean-centering was an effective technique to remedy such violations.

and the prime condition variable for the relevant dependent variables (all *p*s > .80). In other words, the homogeneity of regression slopes assumption was not violated.

Main effects: Experimental prime conditions. As can be seen in both Tables 8 and 9, the experimental condition variable did not have a statistically significant main effect on any of the dependent variables (see descriptive statistics Table 7). Therefore, regardless of which experimental condition participants were in, they reported similar levels of mood and weight satisfaction and ate similar amounts of M&Ms during the taste test. In other words, exposure to IBM seemed to have little effect on participants in this sample.

Table 7
Between-Condition Descriptive Statistics for the Dependent Variables in Study 1

	Control		IBM	
	Mean	**SD**	**Mean**	**SD**
Positive Mood covariate: pre. mood	0.35	0.21	0.35	0.21
Negative Mood covariate: pre. mood	0.22	0.21	0.21	0.21
Weight Satisfaction covariate: pre. satisfaction	5.07	2.48	4.81	2.59
Food Intake	38.14	27.06	47.00	24.38

Note. Where covariates have been controlled for, the descriptive statistics have been adjusted for the covariates' influence.

Main and interaction effects: Restraint Scale-concern for dieting subscale.

Table 8 displays the results of the HMRs involving the RS-CD. For all four dependent variables, there were issues of multicollinearity between the variables within the interaction variable (RS-CD variable x experimental prime condition variable) and the interaction variable, VIFs > 14.58, tolerances < .08. These violations were amended by centering participants' RS-CD scores prior to recalculating the interaction variable (VIFs < 2.12, tolerances > .47). Additional assumptions (e.g., normally distributed residuals and linearity) were checked for all dependent variables and no violations were detected.

Table 8
Interactive Effects of the Experimental Prime Condition Variable and Participants' Dietary Restraint Status (RS-CD) on the Dependent Variables in Study 1

		R^2 change	df	F	β	b	p
Positive Mood							
1	Pre Positive Mood	.01	1, 102	0.81	0.09	0.08	.37
2	Prime-condition	.00	1, 102	0.01	0.01	0.00	.94
3	RS-CD	.02	1, 102	0.19	-0.06	-0.00	.66
4	Prime x RS-CD	.00	1, 102	0.39	-0.09	-0.01	.53
Negative Mood							
1	Pre Negative Mood	.01	1, 102	1.28	0.11	0.09	.26
2	Prime-condition	.00	1, 102	0.00	0.00	0.00	.96
3	RS-CD	.01	1, 102	0.65	-0.11	0.00	.42
4	Prime x RS-CD	.05*	1, 102	4.99	0.31	0.01	.03
Weight Satisfaction							
1	Pre Weight Satisfaction	.46***	1, 102	42.16	0.49	0.45	.00
2	Prime-condition	.00	1, 102	0.07	0.02	0.08	.79
3	RS-CD	.09***	1, 102	3.67	-0.19	-0.11	.06
4	Prime x RS-CD	.03*	1, 102	6.24	-0.23	-0.19	.02
Food Intake							
1	Prime-condition	.03	1,96	2.22	0.17	8.67	.10
2	RS-CD	.00	1,96	0.13	0.05	0.31	.72
3	Prime x RS-CD	.01	1,96	0.56	-0.11	-0.91	.46

Note. Apart from the R^2 change values, all other values are taken from the last step of each analyses. Any values < 0.001 have been rounded to 0.00. The degrees of freedom are lower in the food intake analyses because seven participants with food allergies did not partake.
*$p < .05$, **$p < .01$, ***$p < .001$.

As mentioned, for ease of interpretation, Table 8 only contains final step statistics. The main effects for dietary restraint that are presented below in the text are Step 1 or 2 (not final step) β-values. Inspection of these β-values showed that restrained eaters reported a statistically significant decrease in weight satisfaction from pre- to post-manipulation (β = -0.34). This measure of dietary restraint did not significantly predict changes in participants' mood from pre- to post-manipulation, or their M&M intake during the taste test.

Mood. As can be seen in Table 8, the interaction between the experimental prime condition variable and participants' restraint status did not significantly predict participants' post-manipulation positive mood (R^2 change < .01, p = .53). However, there was a statistically significant interaction between the restraint variable and the experimental prime condition in predicting post-manipulation negative mood (R^2 change = .05, p < .05). This interaction was plotted (Figure 1) one standard deviation above and below the mean of participants' restraint scores (Aiken & West, 1991). Simple slope analyses showed that there was a significant positive relationship between participants' restraint scores and negative mood for women who had been exposed to IBM (β = 0.32, t = 2.36, p = .02). The opposite, but nonsignificant effect emerged in the Control-condition (β = -0.11, t = -0.81, p = .42).

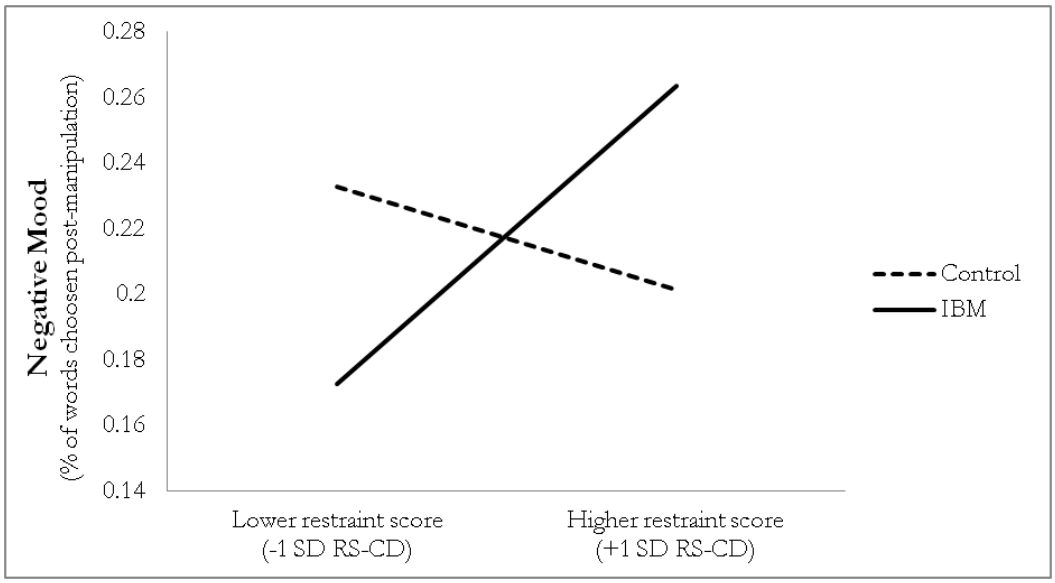

Figure 1. Interactive effect of the experimental prime condition variable and participants' dietary restraint status (RS-CD) on post-manipulation negative mood

Weight satisfaction. The interaction between the experimental prime condition variable and participants' restraint status to predict their weight satisfaction was statistically significant (R^2 change = .03, p = .02). This interaction is presented in Figure 2. There was a negative relationship between participants' restraint scores and weight satisfaction in both experimental conditions. However, this relationship was stronger in the IBM-condition (β = -0.51, t = -5.01, p < .001), compared to the Control-condition (β = -0.19, t = -1.92, p = .06).

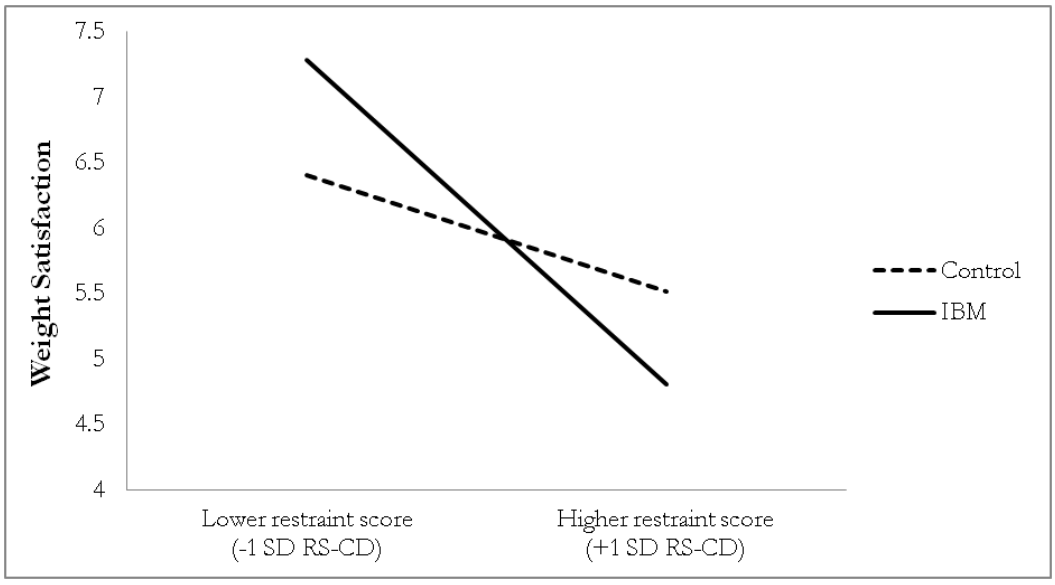

Figure 2. Interactive effect of the experimental prime condition variable and participants' dietary restraint status (RS-CD) on post-manipulation weight satisfaction

Food intake. In the final HMR, I tested whether or not the interaction effect made a significant contribution to the prediction of participants' M&M intake during the taste test. However, the interaction effect in Step 3 was not statistically significant (R^2 change = .01, p = .46).

Main and interaction effects: Dietary Intent Scale. HMRs with participants' DIS scores as the moderator are displayed in Table 9. Regression assumptions (e.g., linearity) were checked for all four dependent variables. No assumptions were violated. Furthermore, unlike the previous HMR analyses, there was not an issue of multicollinearity between participants' DIS scores, the experimental prime variable and the interaction variable for any of the dependent

Table 9

Interactive Effects of the Experimental Prime Condition Variable and Participants' Dietary Restraint Status (DIS) on the Dependent Variables in Study 1

		R^2 change	df	F	β	b	p
Positive Mood							
1	Pre Positive Mood	.01	1, 102	0.48	0.07	0.06	.49
2	Prime-condition	.00	1, 102	0.00	0.01	0.00	.96
3	DIS	.01	1, 102	0.67	-0.11	-0.02	.42
4	Prime x DIS	.00	1, 102	0.08	0.04	0.01	.78
Negative Mood							
1	Pre Negative Mood	.01	1, 102	1.61	0.12	0.10	.21
2	Prime-condition	.00	1, 102	0.00	-0.00	0.00	.97
3	DIS	.00	1, 102	5.11	-0.28	-0.05	.03
4	Prime x DIS	.10**	1, 102	10.99	0.41	0.11	.00
Weight Satisfaction							
1	Pre Weight Satisfaction	.46***	1, 102	46.34	0.55	0.51	.00
2	Prime-condition	.00	1, 102	0.06	0.02	0.04	.80
3	DIS	.03*	1, 102	0.34	-0.06	-0.17	.55
4	Prime x DIS	.03*	1, 102	6.09	-0.23	-1.02	.02
Food Intake							
1	Prime-condition	.03	1,96	2.76	0.17	8.78	.10
2	DIS	.00	1,96	0.03	-0.02	-0.67	.87
3	Prime x DIS	.00	1,96	0.02	0.02	0.73	.91

Note. Apart from the R^2 change values, all other values are taken from the last step of each analyses. Any values < 0.001 have been rounded to 0.00. The degrees of freedom are lower in the food intake analysis because seven participants with food allergies did not partake.

*p < .05, **p < .01, ***p < .001.

variables (VIFs < 9, tolerances > .11). However, to keep interpretation of the statistics and the figures comparable between analyses, participants' restraint status (DIS) was still centered prior to analysis.

The previously discussed statistically significant main and interaction effects obtained with the RS-CD were similar to those obtained with the DIS (see Table 9). Participants' restraint status significantly predicted participants' weight satisfaction. That is, regardless of which experimental condition participants were in, their restraint scores were negatively related to their weight satisfaction after the manipulation (β = -0.19).

Mood. As can be seen in Table 9, the interaction effect (DIS variable x experimental prime condition variable) predicting participants' post-manipulation positive mood was not statistically significant (R^2 change < .01, p = .78). In comparison, on top of the other variables entered into the model, this interaction effect explained a statistically significant 10% (p < .01) of the variance in participants' negative mood (Figure 3). There was a statistically significant positive relationship between participants' restraint scores and their post-manipulation negative mood in the IBM-condition (β = 0.36, t = 2.42, p = .02). This opposite relationship emerged in the Control-condition (β = -0.28, t = -2.26, p = .03).

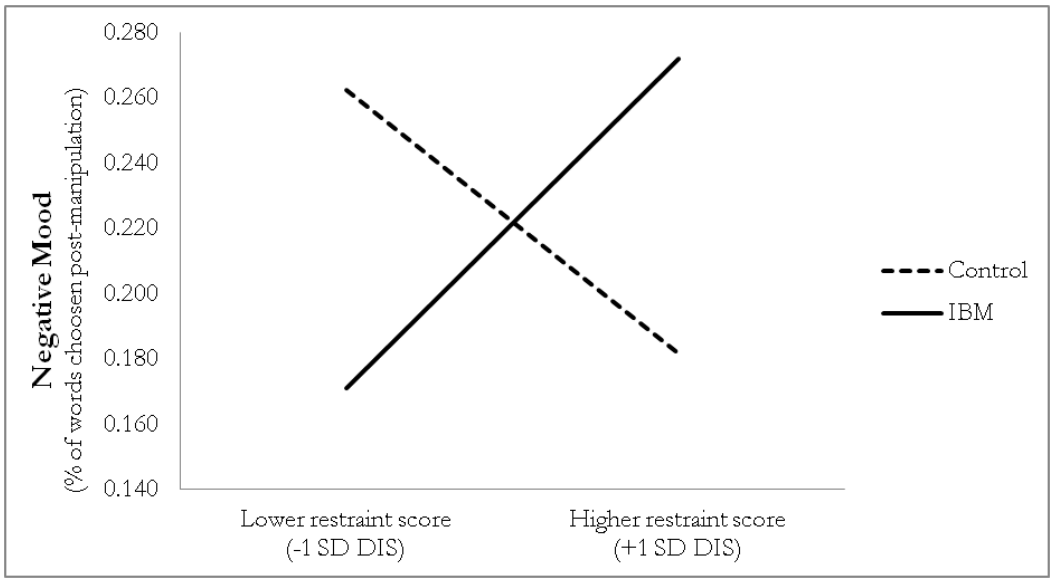

Figure 3. Interactive effect of the experimental prime condition variable and participants' dietary restraint status (DIS) on post-manipulation negative mood

Weight satisfaction. After accounting for the other variables in the model, a significant additional 3% of the variance of participants' post-manipulation weight satisfaction was accounted for by the interaction effect (Figure 4). The negative relationship between participants' restraint scores and their weight satisfaction was not statistically significant in the Control-condition ($\beta = -0.06$, $t = -0.61$, $p = .55$). However, this relationship (restraint scores and weight satisfaction) was statistically significant in the IBM-condition ($\beta = -0.41$, $t = -3.42$, $p = .001$).

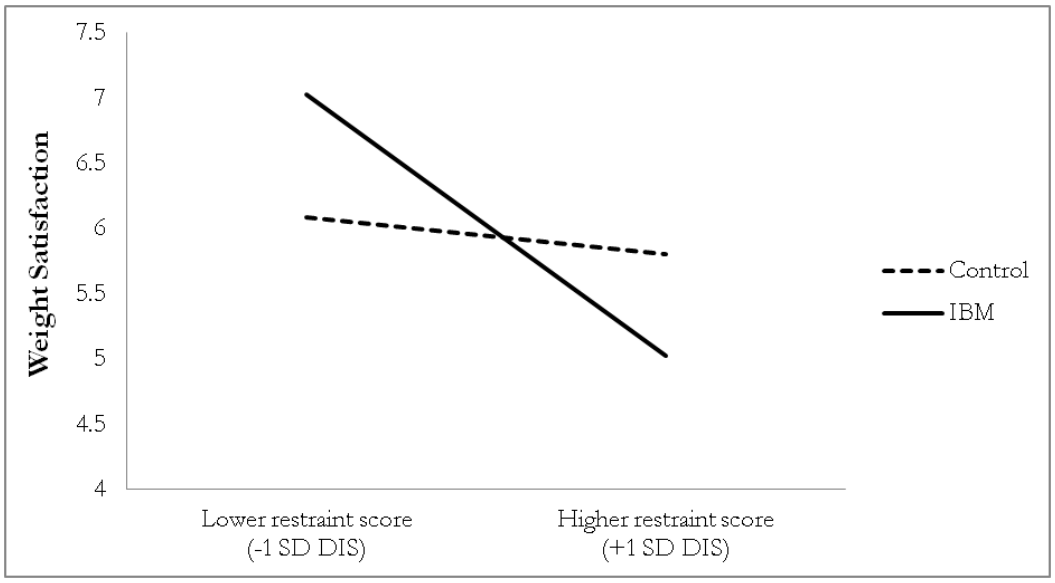

Figure 4. Interactive effect of the experimental prime condition variable and participants' dietary restraint status (DIS) on post-manipulation weight satisfaction

Food Intake. This interaction effect (DIS x experimental prime condition) did not account for a statistically significant amount of variance in participants' food intake (R^2 change < .01, $p = .91$).

Mediation. Advocates of the negative contrast effect imply that restrained eaters exposed to IBM will feel negative, which will in turn, affect their immediate food intake. However, participants' restraint status (independent variable) did not interact significantly with the experimental prime variable to predict food intake (dependent variable). Consequently, according to Baron and Kenny's (1986) rules for mediation, the negative contrast mediational model is not possible in this data set.

Discussion

The main effects of the experimental prime condition variable and participants' restraint status on the dependent variables were explored before the interaction effect. Being in different experimental conditions did not significantly influence participants' implicit mood (positive or negative), weight satisfaction or food intake during the taste test. However, participants' dietary restraint status (DIS and RS-CD) significantly predicted their weight satisfaction. That is, regardless of the experimental manipulation, restrained eaters' weight satisfaction decreased from pre- to post-manipulation. However, this main effect was qualified by an interaction effect (see below).

Turning to the interaction effects, based upon previous research, IBM-exposure was hypothesised to affect restrained eaters' self-evaluations (i.e., weight satisfaction) and mood. Because both restraint scales (RS-CD and DIS) identify weight-concerned women (e.g., weight dissatisfied and body-image invested), with comparable social comparison tendencies, similar results were expected for restrained eaters identified with either restraint scale (Hypothesis 1). If the data were consistent with the negative contrast effect, then restrained eaters should have reported negative effects after IBM-exposure. However, if the data were consistent with the thinness fantasy effect, then restrained eaters who were exposed to IBM should have reported positive effects. Second, it was hypothesised that IBM-exposure would trigger unsuccessful restrained eaters (RS-CD), rather than successful restrained eaters (DIS), to eat significantly more than other participants during the taste test (Hypothesis 2).

The two restraint scales interacted with the experimental prime condition variable in virtually identical ways. The data were compatible with Hypothesis 1, but not with Hypothesis 2. Regardless of the restraint scale analysed, IBM-exposure negatively affected restrained eaters' mood and weight satisfaction. These results are consistent with the self-evaluative component of the negative contrast, rather than the thinness fantasy effect. However, in terms of participants' food intake, the interaction between their restraint status and the experimental condition variable

was not statistically significant. Inconsistent with Hypothesis 2, this finding suggests that both successful and unsuccessful restrained eaters managed to restrain their eating, or at least not eat more than others, after IBM-exposure.

IBM, self-evaluations and mood. As previously noted, subsets of vulnerable women who share commonalities with restrained eaters (e.g., weight-dissatisfied women) are negatively affected by IBM (e.g., Posavac et al., 1998). It seems peculiar that negative effects have not been found among restrained eaters in other studies (e.g., Mills et al., 2002). The results of the current study align with previous (non-restraint) IBM-research suggesting that vulnerable subsets of women (i.e., restrained eaters) react negatively to viewing IBM.

Mills et al. (2002) attributed the inconsistencies within the literature to the presence of experimental demand characteristics. They showed that experimental demands led participants to report negative mood and that reducing these demands saw restrained eaters report self-enhancement. However, several steps were taken to reduce these demands in the current study. The experimental design was elaborate and the study's purpose was shrouded by a two-study pre-text and cover story. In addition, the mood measure was implicit, and explicit measures (weight satisfaction and food intake) were part of the second, unrelated study. Last, participants' data were not included in the main analyses if they made a connection between the IBM-exposure and the dependent variables. Accordingly, it is unlikely that the statistically significant negative effects reported by restrained eaters in the current study were an artefact of demand characteristics.

Consequently, it is now questionable why restrained eaters in this study reported significant negative effects, but restrained eaters in other studies did not (e.g., Mills et al., 2002; Anschutz, Engels et al., 2009). There are a number of possibilities. In comparison to other studies, participants' weight satisfaction was measured at two time points in the current study, which increases the statistical power to detect significant effects (Bonate, 2000). Additionally, participants completed an implicit, rather than explicit measure of mood. Although other (non-

restraint) IBM-researchers have found significant negative mood effects with explicit measures (Birkeland et al., 2005), demand characteristics may have exaggerated some of those effects, and such explicit mood effects have not been found among restrained eaters (e.g., Strauss et al., 1994; Warren, Strauss et al., 2005). Perhaps restrained eaters' IBM-related mood needs to be measured implicitly, rather than explicitly. As mentioned, it is conceivable that in comparison to women in general (Grabe et al., 2008) or women with body-image disturbances who report explicit negative mood after IBM-exposure (Heinberg & Thompson, 1995), restrained eaters are more inclined to defend against the media's negative effects. That is, more than other women, restrained eaters might (consciously or unconsciously) defend against explicit, but not implicit mood measures. Hass et al. (1992) specifically designed the implicit mood measure to be used in circumstances biased by such defensiveness and situational demands. Therefore, restrained eaters' defensiveness might explain why explicit negative mood effects have been found with women in general/other vulnerable women, but not among restrained eaters, and why significant negative implicit mood effects were found in Study 1 among restrained eaters.

Social comparison and IBM-related attention. Another reason that restrained eaters reported negative effects might have been the high level of attention paid to the experimental manipulation. As previously mentioned, for the majority of the population, comparing one's body size and/or appearance to IBM will be an upward comparison (Fouts & Burggraf, 1999; Fouts & Burggraf, 2000). A number of variables predict whether or not drawing upward social comparisons affect the comparer positively or negatively. Social comparisons with media models lead to negative effects when comparisons are drawn for self-evaluative purposes, but not when they are drawn for self-improvement purposes (Halliwell & Dittmar, 2005; Martin & Gentry, 1997). Therefore, because the significant results imply that restrained eaters experienced negative, rather than neutral effects, restrained eaters likely used IBM for self-evaluative, rather than improvement purposes in the current study. Furthermore, such negative comparison effects are more likely if the comparer: (a) is aware of her own thoughts, feelings, behaviours and goals

(Smeets, Jansen, Vossen, Ruf, & Roefs, 2010; Thornton & Maurice, 1999), (b) is responsive to personal cues, so that she derives her feelings from her own behaviour and appearance (Wilcox & Laird, 2000), (c) considers the comparison value important (Henderson-King et al., 2001), or (d) is less able to dismiss the discrepancy between herself and the comparison target (Collins, 1996).

It is possible that participants in the current study would fit into one or more of these categories. Seven published studies contain relevant data about restrained eaters' post-IBM self-evaluations or mood. However, participants in such studies did not pay full attention to the images. For example, in three studies (Anschutz, Engels et al., 2009; Strauss et al., 1994; Warren, Strauss et al., 2005) participants watched a film in between IBM-exposure (commercial breaks) and did not have to focus on the images (see also Joshi et al., 2004). In comparison, participants in Seddon and Berry's (1996), Ogden and Mundray's (1996) and Mills et al.'s (2002) studies paid relatively more attention to the IBM (e.g., advertising evaluation). However, it is likely that participants in the current study paid more attention to IBM. Participants in Study 1 were required to intently study the images for over 2-minutes and then rehearse these details while completing the subsequent memory test. Some test questions required a cognitive reconstruction of the thin model. For example, participants needed to report the colour of the models' lipstick and describe what the model was holding in her hand (Appendix K). No past researcher required participants to complete a memory test about the experimental prime images[29]. Consequently, in comparison to other studies, participants in the current study possibly processed the IBM in greater detail.

Perhaps this methodological difference explains why restrained eaters in the current study were affected negatively, whereas other researchers found nonsignificant or statistically significant but opposing effects. For instance, because restrained eaters value their appearance

[29] Although participants in Monro and Huon's (2006) study completed a memory test, comparisons are limited because they did not measure participants' post-IBM self-evaluations or mood.

and are susceptible to this sociocultural pressure to be thin (Jiang & Vartanian, 2012; Spangler & Stice, 2001), such detailed processing may have encouraged thin-ideal internalisation and one (or more) of the above behaviours (e.g., contemplating the discrepancy between her own body and the models' bodies). Such a response can lead to negative self-evaluations (e.g., Collins, 1996). In comparison, comparing this study to those presented in Table 1 implies that lower levels of IBM-attention might have buffered restrained eaters from experiencing negative self-evaluations or mood in previous research. In summary, the attention and processing time directed toward the IBM may be an important variable that contributes to restrained eaters' self-evaluations and mood after IBM-exposure.

IBM and eating behaviour. Based upon previous research, IBM-exposure was hypothesised to trigger eating among restrained eaters identified with a measure of unsuccessful restraint (e.g., Strauss et al., 1994). In comparison, it was expected that successful restrained eaters exposed to IBM would eat no more than other participants would eat during the taste test (Anschutz, Engels et al., 2009; Anschutz, van Strien et al., 2008). However, neither measure of dietary restraint status significantly predicted participants' food intake after IBM-exposure. Regardless of the restraint scale, IBM-exposure did not encourage restrained eaters to eat a statistically significant different amount of food than other participants. Similar to previous research (Anschutz, Engels et al., 2009), restrained eaters identified with a successful measure of dietary restraint (DIS) did not eat significantly more than other participants ate. Whereas, in contrast to previous research (e.g., Mills et al., 2002; Strauss et al., 1994), unsuccessful restrained eaters (RS-CD) in the current study restrained their eating after IBM-exposure. This finding is noteworthy given that unsuccessful restrained eaters (RS) display positive hedonic reactions toward tempting food and generally break their diets when confronted with such temptation (Hofmann, van Koningsbruggen, Stroebe, Ramanathan, & Aarts, 2010; Stroebe, Mensink, Aarts, Schut, & Kruglanski, 2008). Perhaps IBM-exposure encouraged some inhibiton among restrained eaters in the current study.

Control theory and IBM-related attention. Control theory (Carver, 2003; Carver & Scheier, 1982; Carver & Scheier, 1990; Carver & Scheier, 1998) might provide some clues to interpret these findings. Control theorists denote that a feedback loop governs goal-related behaviour. Theoretically, negative affect should develop if goal-related progress falls below a comparison standard. Consequently, this negative affect should trigger goal effort and performance enhancement. Stated slightly differently, a perceived discrepancy between one's present condition (e.g., body size) and a comparison value (e.g., thin model's body size) leads to negative affect, which in turn triggers goal-related behaviour (e.g., dietary restraint).

Control theory is well supported. For example, empirical research shows that when comparing upward and experiencing benign envy, rather than admiration, individuals demonstrate better motivation and performance (van de Ven, Zeelenberg, & Pieters, 2011). Perhaps the negative affect recorded by restrained eaters in the current study—a self-evaluative effect possibly associated with the high attention paid to the IBM—triggered goal thoughts and increased goal effort (e.g., controlled eating). This concept bears resemblance to Strauss et al.'s (1994) reinhibition theory (Chapter 1). This is the idea that viewing IBM reminds restrained eaters of their goal and encourages dietary restraint. However, because of Strauss et al.'s experimental design, participants in their study were encouraged to pay low, rather than high attention to IBM. Perhaps, Strauss et al.'s data would have been consistent with reinhibition theory (and control theory) had participants paid high attention to the experimental manipulation. In other words, IBM-exposure might have triggered negative self-evaluations and dietary restraint among restrained eaters.

Limitations. There are some limitations to the current study. Although well intended, the questions in the pre-test questionnaire may have alerted some participants to the purpose of the study. This limitation was likely managed by questioning participants post-experiment and by conducting the main statistical analyses without data obtained from participants who connected the unrelated studies. Still, in an effort to minimise this influence and because it was difficult

recruiting a large number of participants for a two-phase study, I did not include a pre-test in my subsequent study.

In addition, before confidently theorising about restrained eaters' IBM-related food intake, there were two limitations that might have influenced and masked participants' true eating behaviour in Study 1. First, it is possible that running the analyses without obese participants affected the results. Although, these participants were not included for previously justified reasons, not all IBM-researchers analyse their data in such ways. However, although not included in the Results section, the significant and nonsignificant interaction effects (mood, weight satisfaction and food intake) did not change when the analyses were repeated with these seven participants. Second, different researchers have used different comparison/control images in their experimental manipulations. Some have used overweight advertising models (e.g., Mills et al., 2002), some have used neutral advertisements that differ from the IBM-advertisements (e.g., Warren, Strauss et al., 2005), and some have used the same IBM-advertisements with the thin model digitally removed (e.g., Monro & Huon, 2006). I employed the latter technique similar to Monro and Huon (2006). Conceivably, the experimental conditions need to be more distinct. It may not be coincidental that, participants' restraint status did not interact significantly with the prime condition variable to predict food intake during the taste test in the current study and in Monro and Huon's study. To elaborate, the only difference between the experimental IBM-images and the Control-images was the presence of a thin model. Digital software was used to remove the thin model from the Control-images, while keeping the remainder of each advertisement constant. As a result, the differences between participants assigned to these two experimental conditions can be confidently attributed to the presence or absence of thin models. However, in hindsight, these two conditions might have been too similar. Although statistically significant self-evaluation and mood results were obtained with these experimental conditions, the possible effect of IBM-exposure on restrained eaters' food intake might be more subtle. The Control-images might have affected participants' food intake similarly to the IBM-images

because both types of images enforce feminine beauty. Although these Control-images did not contain thin models, and social comparisons with the images were not possible, the beauty products (e.g., perfume and make-up) in the advertisements may still have primed beauty, although not thinness, related thoughts. Therefore, I added a new experimental condition to Study 2.

Last, comparative to the current study, previous researchers that have found significant IBM-eating effects have measured participants' food intake during (e.g., Anschutz, van Strien et al., 2008; Strauss et al., 1994; Warren, Strauss et al., 2005), or soon after IBM-exposure (e.g., Mills et al., 2002; Seddon & Berry, 1996). Perhaps the effects of viewing IBM upon participants' food intake are short-lived. Because of the way I designed Study 1, comparative to previous research, there was a larger time interval between the IBM-exposure and the taste test. After the experimental manipulation, participants completed the implicit measure of mood and then swapped to the unrelated study to do the taste test. The implicit mood measure took about 3-4 minutes, and the briefing for the second study took about 1-2 minutes. Although, this interval was short, I sought to minimise the gap between the independent and dependent eating-related variable in Study 2.

Summary. Regardless of the restraint scale, restrained eaters in the current study reported heightened negative mood and decreased weight satisfaction after IBM-exposure. However, regardless of these statistically significant negative effects, IBM-exposure did not significantly affect restrained eaters' food intake. Although the choice of restraint scale likely influences IBM-eating patterns, this choice only appears to be part of the puzzle. Comparing the patterns within previous research to the present results also highlights the influence of participants' IBM-related attention. This is the only IBM-study where participants completed a memory test about the images and completed self-evaluative and mood measures. The current study is also the first IBM-study where restrained eaters reported negative effects. Drawing upon control theory, I proposed that their high IBM-related attention level may have led restrained

eaters to negatively contrast themselves to the models in the images, which activated their dietary restraint goal and encouraged their dietary restraint during the taste test.

Chapter 4

Study 2 Experimental Analyses

In Study 1, successful (DIS) and unsuccessful (RS-CD) restrained eaters reported negative effects after IBM-exposure. Regardless of this significant effect, IBM-exposure did not significantly affect their food intake during the taste test. Some other researchers have also measured restrained and unrestrained eaters' self-evaluations/mood in response to IBM. However, compared to the seven previously published studies, I am the first to find these negative effects among restrained eaters (Study 1). These effects have mainly been attributed to the high levels of attention participants were asked to pay to the experimental prime images (Chapter 3). Based upon control theory, it was further reasoned that restrained eaters may have used the negative affect caused by IBM-exposure to self-regulate their food intake during the taste test.

Based upon a review of relevant research, in Study 1 I hypothesised that unsuccessful (RS-CD), but not successful (DIS) restrained eaters would eat more than others after IBM-exposure. From Study 1 it seemed that, when paying full attention to IBM, scoring highly on different measures of dietary restraint (i.e., successful vs. unsuccessful) did not influence restrained eaters' response to the images. However, when the nonsignificant eating results are compared to previous research, it seems plausible that these measures of dietary restraint (i.e., restraint success) interact with how much attention participants direct toward the IBM (see Chapter 5). In the current study and the next study in this thesis I will focus on testing the assumptions based on control theory (Study 2, this Chapter) and systematically manipulating participants' IBM-related attention levels (Study 3, Chapter 5).

To recap, Carver and Scheier (1982) proposed that goal-related negative affect triggers goal thoughts and encourages goal effort (control theory). Theoretically, a large discrepancy between one's current goal standing and end goal should trigger negative affect. Goal effort is then increased to close the discrepancy and reduce negative affect. IBM-exposure may have

threatened and/or activated restrained eaters' weight-loss goal in Study 1, causing negative affect and self-regulation. The idea that goal threats or goal-related negative affect encourage goal-congruent behaviour among weight-concerned women is in line with previous research. For example, de Ridder, Kuijer, and Ouwehand (2007, Study 2) found that objectively threatening participants' weight goal (e.g., weight loss is not a realistic goal) led to goal effort and dietary self-control. Weight-concerned women whose goal had been threatened consumed fewer cookies in an unrelated taste test.

Opposing theories need acknowledgement. Not all self-control theorists agree with control theory. Muraven and Baumeister (2000) developed the strength model of self-control. They theorised that stressful or threatening situations breakdown self-control (e.g., Leith & Baumeister, 1996; Tice et al., 2001). Theoretically the act of self-control consumes a proportion of self-control strength—a limited resource (Muraven & Baumeister, 2000). Self-control strength is likened to a muscle that should weaken with overuse. Consequently, when a self-control task has recently depleted the self-control reservoir, subsequent self-control should be poor. Accordingly, Muraven and Baumeister would hypothesise that experiencing or regulating IBM-induced negative affect would diminish self-control resources and cause participants to eat more than others during the taste test. Obviously, this effect did not occur in Study 1. Experiencing negative affect after IBM-exposure did not breakdown restrained eaters' impulse control during the taste test. For this reason, I used control theory, rather than the strength model, to guide Studies 2 and 3.

Approaching Goals and/or Avoiding Temptations

In line with control theory, I sought to clarify if IBM-exposure and the corresponding negative affect: (a) encouraged restrained eaters to approach their dieting goal, (b) made restrained eaters want to avoid tempting foods, or (c) did both. Because of demand characteristics, participants could not just be asked these questions. In addition, explicit approach and avoidance measurement might be limited by participants' psychological defences or

introspective limits (Greenwald et al., 2002), and these approach and avoidance tendencies might need to be measured implicitly.

Contemporary self-control researchers have reported that deliberate self-control efforts (e.g., avoiding tempting foods) have implicit connections (e.g., Fishbach et al., 2003; Shah, Friedman, & Kruglanski, 2002). It is well established that individuals automatically approach positive stimuli and avoid negative stimuli (Chen & Bargh, 1999; Duckworth, Bargh, Garcia, & Chaiken, 2002; Solarz, 1960). In line with the rationale above, these implicit associations were tested by drawing upon Fishbach and Shah's (2006) research.

Fishbach and Shah (2006) conducted several experiments to investigate whether or not these automatic approach and avoidance tendencies were goal dependent. For instance, depending upon one's goals, a stimulus (e.g., birthday cake) might be evaluated positively by one person and negatively by another person (i.e., a dieter). In their first experiment, Fishbach and Shah used a joystick lexical decision task (LDT) to test such tendencies. This task contained a mixture of real words and fake/pseudo-words. Before the LDT, participants identified a relevant goal and associated temptation (e.g., study and film). These words were incorporated into their own personalised LDT. Therefore, some of the real words in the task were goal-related (i.e., positive) and some were temptation-related (i.e., negative). Half of the participants needed to pull the joystick in response to the real-words (Approach-condition), and the other half needed to push the joystick (Avoidance-condition). This LDT allows researchers to assess participants' implicit tendencies to, psychologically and physically, approach goals and avoid temptations. Consistent with their hypotheses, Fishbach and Shah found that participants had an automatic predisposition to approach goals and avoid temptations.

Next, Fishbach and Shah (2006, Study 2) used a task similar to the joystick LDT in a sample of dieters[30] and non-dieters. The task contained a mixture of fitness words (e.g., shape

[30] Dieters were identified by the yes/no question "do you sometimes diet". Fifty-two percent of Fishbach and Shah's (2006) sample responded positively to this item. In Fishbach and Shah's pilot study, this item correlated positively with participants' RS scores ($r = .44$).

and muscles) and tempting food words (e.g., chocolate and butter). Half of the participants were required to pull (push) the joystick in response to food (fitness) words, whereas half needed to pull (push) the joystick in response to fitness (food) words. Although self-reported dieters' response times to approach fitness words and approach food words did not differ significantly, they avoided food words significantly faster than they avoided fitness words. These dieters also approached fitness words significantly faster than they avoided fitness words. In comparison, non-dieters were significantly faster to approach food words than to approach fitness words. Conversely, there was not a statistically significant difference between non-dieters response times to avoid fitness and food words. Therefore, although the results were mixed, dieters were more inclined to display the expected automatic approach (fitness goal) and avoidance (food temptation) pattern. Based upon these results, Fishbach and Shah suggested that an individual's implicit drive to avoid negative stimuli and approach positive stimuli is goal dependent (e.g., temptation vs. goals).

The Present Study

The design of Study 2 differed from Study 1. To minimise demand characteristics in Study 1 participants were led to believe that the taste test was part of a second, ***unrelated*** study. However, taste tests do not measure participants' diet-goal activation. For this reason, a joystick LDT, rather than a taste test was used in Study 2. Second, the taste test in Study 1 was also replaced with a LDT for logistical reasons. Because LDTs are implicit measures they are not confounded by demand characteristics. Consequently, Study 2 did not require a two-study cover story. The LDT allowed the measurement of participants' diet-goal approach/avoidance tendencies without explicitly asking them and their implicit approach/avoidance of tempting foods without the objective use of a taste test Also, new to Study 2, participants completed a healthy food choice test (Fishbach & Shah, 2006, Study 5). This explicit measure was included to investigate whether or not participants' food choices would mirror their LDT results.

Additionally, in Chapter 3, the concern was raised that the nonsignificant taste-test results in Study 1 might have been an artefact of the similarity between the Control- and IBM-images, and/or the time interval between the experimental primes and the eating-related outcome measure (taste test). These limitations were accounted for in Study 2. First, this study contained *three* experimental conditions: IBM-, Control- and a new Neutral-condition. The Neutral-images were not related to feminine appearance or beauty. Second, the computer assessment of implicit mood was replaced with a single-item implicit self-esteem measure. This redesign meant that participants transitioned from the experimental slideshow/memory test to the LDT almost immediately. Last, participants did not complete a pre-test questionnaire in Study 2. This questionnaire was eliminated to reduce the possibility that the sample would be over represented by weight-satisfied participants as the sample in Study 1 was.

Self-evaluation hypotheses. In line with the cross-sectional analyses presented in Chapter 2, participants who scored higher on both restraint scales (DIS and RS-CD) were expected to report lower weight satisfaction and self-esteem. However, the hypothesised interaction effects (experimental prime condition variable x dietary restraint status) were expected to qualify these main effects. Based upon Study 1, it was hypothesised that both successful (DIS) and unsuccessful restrained eaters (RS-CD) would report negative self-evaluations (weight satisfaction and implicit self-esteem) after attentive IBM-exposure (i.e., a replica of Study 1's manipulation).

Diet-goal and eating-related hypotheses. As mentioned, a joystick LDT and healthy food choice test were used to measure participants' approach tendencies (toward their diets) and their avoidance tendencies (toward tempting foods). Based upon Fishbach and Shah's (2006) research it was hypothesised that, because of restrained eaters' presumed healthy-eating and weight-loss intentions, higher restraint scores in all experimental conditions would be related to faster avoidance (slower approach) of tempting food words and faster approach (slower avoidance) of diet words. Similarly, restraint scores were hypothesised to relate positively with

participants' healthy food choices. In line with the correlational results discussed in Chapter 2, these restraint-related effects might be more pronounced among successful (DIS), rather than unsuccessful (RS-CD) restrained eaters.

However, statistically significant interaction effects were expected to qualify these main effects. The LDT was primarily used to investigate whether or not viewing IBM reminded restrained eaters of their dieting goal and/or if IBM-exposure made them want to regulate their food intake (i.e., experimental prime condition variable x dietary restraint status). Based upon Study 1's results and upon control theory, it was hypothesised that the negative self-evaluations (triggered by IBM-exposure) would encourage restrained eaters (DIS and RS-CD) to approach diet-goal words and avoid tempting food (i.e., words in the LDT and unhealthy options in the food choice test).

Subsample: Self-reported dieters. New to Study 2, participants were asked a single yes/no dieting question (Fishbach & Shah, 2006). For additional exploratory analyses, self-reported dieters' weight-goal (kg), goal effort and goal difficulty were measured. In line with control theory, IBM-exposure might remind dieters of their goals. Therefore, it was hypothesised that, like restrained eaters, dieters exposed to IBM-, rather than Control- or Neutral-images, would report negative self-evaluations, approach diet-goal words (LDT) and avoid temptations (LDT and food choice test). In addition, dieters should report higher goal effort and lower goal difficulty.

Method

Participants. As previously outlined in Chapter 2, participants responded to email or poster advertisements for a study investigating female task performance and personality traits (cover story). Participants were either offered psychology course credit or $10 NZ as reimbursement. Three-hundred and ten university students completed the study. In addition to the 20 obese participants excluded in the cross-sectional analyses, the experimental analyses were conducted without a further 22 participants. Similar to Study 1, participants who made the

connection (n = 5), or were suspicious[31] of some connection (n = 10) between the experimental manipulation and the dependent variables were excluded from the main analyses. In addition, seven participants over the age of 40 were also excluded. Consequently, the final sample comprised 268 female students (79% Psychology students), with a mean age of 20.33 (SD = 3.73, range 16-39) and a mean BMI of 22.98 (SD = 2.90, range 16.00-29.97). Seventy-six percent of the sample identified themselves as New Zealand European, 5% as New Zealand European and New Zealand Māori, 3% as New Zealand Māori, 3% as Chinese and the remaining 13% as other (e.g., Indian or Samoan). Because of the elimination of suspicious participants, there were fewer participants in the IBM-condition (n = 81) than the Control- (n = 94) and Neutral- (n = 93) conditions. Condition numbers also differed because of the exclusion of other participants (e.g., obese or elder participants) after data collection. Random assignment was successful. There were no statistically significant differences between participants in the three experimental conditions in terms of age, BMI or dietary restraint status (Table 10).

In terms of the LDT analyses, only participants who rated their English language fluency (1 = *not fluent*, 10 = *very fluent*) over 7/10 were included in the LDT analyses. This cut-off meant that the LDT analyses included 259 participants, 127 in the Avoidance-condition and 132 in the Approach-condition. As above, although randomly assigned to the conditions, condition numbers differed slightly for various justified reasons (i.e., elimination of certain participants after data collection).

In addition, the subsample of self-reported dieters consisted of 89 participants (M_{age} = 20.02, M_{BMI} = 23.62). Of the participants who were randomly assigned to the IBM-condition, 28 indicated that they were dieting. Numbers were comparable in the comparison conditions. That is, 29 of the participants in the Neutral-condition and 32 of the participants in the Control-

[31] In Study 2 I improved upon my debriefing procedure used in Study 1. In Study 1, notes were only taken if the participant directly connected the independent and dependent variables (i.e., the two unrelated studies). In Study 2, participants who connected the independent and dependent variables were coded, as were participants who were suspicious of the cover story but could not articulate why.

Table 10
Between-Condition Comparisons on Individual Difference Measures in Study 2

	Control		Neutral		IBM		df	F	p	η^2
Main Sample	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**				
Age	20.80	3.87	20.12	4.12	20.02	3.03	2, 265	1.16	.32	.01
BMI	23.47	2.82	22.49	2.75	22.98	3.09	2, 265	2.73	.07	.02
Restraint (RS-CD)[a]	7.63	3.31	8.26	3.17	7.33	3.47	2, 265	1.82	.16	.01
Restraint (DIS)[a]	19.65	5.66	19.76	6.32	17.95	6.49	2, 265	2.31	.10	.02

[a]Participants completed this measure after the experimental manipulation and outcome measures.

Table 11
Between-Condition Comparisons on Individual Difference Measures in Study 2's Subsample of Dieters

	Control		Neutral		IBM		df	F	p	η^2
Subsample Dieters	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**				
Age	20.19	2.50	19.45	3.37	20.54	3.23	2, 86	0.93	.40	.02
BMI	24.46	2.48	22.83	1.84	23.48	3.38	2, 86	2.98	.06	.07
Restraint (RS-CD)[a]	9.44	3.53	10.28	3.16	10.14	3.14	2, 86	0.58	.56	.01
Restraint (DIS)[a]	22.36	4.74	24.45	3.19	22.86	7.01	2, 86	0.99	.38	.02

[a]Participants completed this measure after the experimental manipulation and outcome measures.

condition indicated that they were dieting. As in the main sample, there were no statistically significant pre-existing differences (age, BMI and restraint status) between participants in the three experimental conditions (Table 11).

Procedure. The appropriate Ethics committee approved this experiment (HEC 2009/112; Appendix P). Participants completed the study individually. Once participants had consented to participate (Appendix Q), they began the questionnaire with a set of demographic questions (age, ethnicity and English language fluency). Next, they were shown one of three PowerPoint presentations (see Manipulation). Participants were told that the memory test associated with this presentation was the first measure of task performance. Directly following this memory test, participants completed what they thought was the second measure of task performance, the joystick LDT.

After the LDT, participants returned to the questionnaire. Here participants completed the healthy food choice test—the third and final task performance measure. Participants then worked through the scales in the booklet. They completed measures of the remaining dependent variables (weight satisfaction, implicit self-esteem and dieting behaviour), followed by the two measures of dietary restraint[32]. Finally, the experimenter weighed all participants and measured their height.

At the conclusion of the study, the experimenter asked participants what they thought the study was about. If participants indicated that it was about body image or food/dieting, they were asked why they thought that and at what point in their participation this thought occurred to them. The experimenter took note of suspicious participants and those who directly connected the experimental manipulation to the dependent variables. As mentioned, the analyses were conducted without these participants (n = 15). Participants were then provided with a debriefing sheet (Appendix R) that explained the purpose of the study and why deception was

[32] As outlined in Chapter 2, participants also completed scales assessing their dispositional self-control, approach/avoidance tendencies and their chocolate cravings/likings.

used. Once they had read this sheet, the experimenter checked that the participant understood the study and asked if they had any questions. Participants were then reimbursed for their time, given a can of Coke or vegetable juice (i.e., the healthy food choice test) and asked not to discuss the purpose of the study with other students.

Manipulation. For the most part, the manipulation was the same as in Study 1, except I added one extra experimental condition to Study 2—a Neutral-slideshow. The Neutral-slideshow was not included in Study 1, and contained seven new images of products that were completely unrelated to femininity or beauty (see Appendix S for an example image). For example, this slideshow contained images of scooters, Lego and stationary. As in Study 1, each advertisement was displayed for 20 s before the slide automatically changed and participants completed a memory test (Appendix T) about the images after the slideshow.

Measures. Participants completed self-report items that measured their dietary restraint status, weight satisfaction, implicit self-esteem and healthy food choices. The self-reported dieters completed additional diet-related questions. The joystick LDT was used to measure participants' approach and avoidance tendencies.

Dietary restraint status. Participants' restraint status was measured with the DIS (present study Cronbach's $\alpha = .84$) and the RS-CD (present study Cronbach's $\alpha = .75$). Both measures were completed toward the end of the study after the dependent variables.

Body mass index. As in Study 1, the experimenter weighed each participant and measured their height at the end of the study.

Weight satisfaction. Participants rated their weight satisfaction on a 10-point scale (1 = *not at all satisfied*, 10 = *very satisfied*).

Implicit self-esteem. Participants completed the previously outlined (Chapter 2) implicit self-esteem item (Gebauer et al., 2008). Participants rated how much they liked their full name from 1 (*not at all*), to 9 (*very much*).

Healthy food choice. In the questionnaire booklet, participants read that the following pages contained six sets of food items (Fishbach & Shah, 2006, Study 5). They were told that this was the final measure of task performance and that their task was to choose the item that they would most prefer from each set. To encourage accurate responding they were also informed that they would receive one of these items at the end of the study. Each set of images contained one healthy and one unhealthy food item (e.g., a chocolate bar or low-fat yoghurt, a can of Coke or a can of vegetable juice). At the end of the experiment, participants received either a can of Coke or vegetable juice. Response items were coded 0 = *unhealthy choice*, 1 = *healthy choice*. Participants' choices were summed, meaning that a higher number indicated more healthy choices.

Joystick lexical decision task (LDT). Directly following the experimental manipulation, participants completed the joystick LDT on a desktop computer (see Chen & Bargh, 1999; Duckworth et al., 2002; Fishbach & Shah, 2006; Solarz, 1960). The LDT was programmed in SuperLab Pro for Windows (Version 2.01). To achieve millisecond accuracy, a joystick was purpose built to emulate a mouse that was connected to the serial port of the computer. The push of the joystick was wired to activate the left click of the mouse, whereas pulling the joystick was wired to activate the right click of the mouse. The joystick was fixed to a desk between the participant and the computer screen.

During this task participants are presented with an equal number of pseudo-words and real words. Participants are asked to decide as quickly and as accurately as possible whether each word is or is not a word. Each trial begins with a fixation point (+) in the centre of the screen for 200 ms. This fixation point is then replaced by either a real word or pseudo-word until the participant responds with the joystick. This word is followed by an inter-stimulus-interval for 500 ms before the next trial.

Following Fishbach and Shah (2006), half of the sample was randomly assigned to push the joystick if they saw a real word and pull the joystick if they did not see a real word (stimulus

avoidance). The other half of participants were assigned to pull the joystick if they thought they saw a real word and push the joystick if they did not see a real word (stimulus approach). Participants completed ten practice trials in which the computer was programmed to provide feedback if they were responding too slowly[33] or if they responded incorrectly. After the practice trials, participants were given the opportunity to ask the experimenter any questions before beginning the 120 trials.

Sixty trials contained six diet words (e.g., "diet"), six tempting food words (e.g., "chocolate"), 18 neutral words (e.g., "concrete") and 30 pseudo-words (e.g., "sistory"; see Appendix U for a full list). The total 120 trials contained two blocks of the same 60 (30 words and 30 pseudo-words) words. In each block the words/pseudo-words were displayed randomly.

There are several points to note about the LDT analyses. First, participants' response times to approach/avoid the diet words and the food words were calculated as separate variables. In addition, the food words category was split into two separate variables. Previous IBM-research has found different results for participants' sweet food and savoury food intake (e.g., Monro & Huon, 2006). This difference might be because compared to savoury foods, sweet foods high in sugar reduce negative affect (Dube, LeBel, & Lu, 2005). Therefore, food words in the LDT were either categorised as savoury (fries and hamburger) or sweet (ice cream, chocolate, cake and cookie). Consequently, there were three separate LDT variables: diet words, savoury food words and sweet food words. Second, incorrect responses were coded as missing and were not analysed (e.g., Bargh, Chaiken, Govender, & Pratto, 1992; Fazio, 1990). Third, following previous researchers (e.g., Fishbach et al., 2003), the presence of outliers (3 *SD*s from cell mean) were checked prior to analyses. As is common among reaction-time data (Ratcliff, 1993), various outliers were identified. Therefore, to minimise the possible effect of these outliers, all of the LDT data were log transformed (e.g., Fishbach et al., 2003). All LDT analyses

[33] This LDT was piloted prior to this study. Participants in the current study were told if they were going too slowly based upon the reaction time of pilot participants (3 *SD*s from the cell mean).

and any significant LDT results have been conducted and graphed with the transformed data. However, for ease of interpretation, the non-transformed LDT data are presented in the descriptive statistics sections. Finally, participants' reaction times toward the group of neutral words were controlled for in all LDT analyses.

Dieting goal. Five questions were used to assess participants' dieting goal, effort and perceived difficulty. First, participants were asked if they were currently dieting to lose weight; if they answered yes they completed four additional questions (i.e., subsample of dieters). The four questions were: how much weight they would like to lose (kg), how much effort they were willing to invest into attaining this goal (1 = *no effort*, 10 = *all it takes*), how difficult they find avoiding high-calorie foods and how difficult they expected it to be to reach their weight-goal (1 = *not difficult*, 10 = *very difficult*).

Analyses. Following descriptive and correlational analyses, several HMRs with test of homogeneity of slope (using SPSS GLM) were computed with possible covariates (e.g., BMI), and the restraint variable and the experimental prime condition variable as the independent variables. The dependent variables were participants' weight satisfaction, implicit self-esteem, healthy food choice and LDT-variables[34]. As in Study 1, the main analyses were performed twice, once using participants' RS-CD scores, and then participants' DIS scores. Rather than performing median splits, participants' restraint scores were kept as continuous measures.

Similar to previous analyses, the variables were entered sequentially and to aid interpretation the additional variance (R^2 change) accounted for by each step is displayed in the appropriate tables. Potential covariates and the experimental prime condition variable were entered first, followed by the restraint variable and then the interaction variable (experimental prime variable x restraint variable). As in Study 1, this sample size had 90% power to detect

[34] All six LDT-variables were normally distributed (all Kolmogorov-Smirnov tests $p > .07$) because they had been log-transformed. The remaining three dependent variables (weight satisfaction, implicit self-esteem and healthy food choices) were not normally distributed (all Kolmogorov-Smirnov tests $p < .05$). However, as Gravetter and Wallnau (2000) noted, this violation is manageable if the sample size exceeds 30.

medium sized interaction effects with alpha set at .05 (Faul et al., 2009). Because there were three conditions, any significant interaction effects were further broken down to determine which regression slopes significantly differed from one another. That is, via dummy coding (West et al., 1996), the regression slopes were compared in three sets of pairs (IBM-slope and Control-slope, IBM-slope and Neutral-slope, Control-slope and Neutral-slope). Last, simple slope analyses (Sibley, 2008) were used to determine the direction and strength of the relationship between participants' restraint score and the dependent variable in question for each of the three slopes (IBM, Control and Neutral).

Second, in the subsample of self-reported dieters, correlations and ANCOVAs were used to explore whether or not the experimental prime condition variable had any main effects on the dependent variables. In addition to the dependent variables listed above, the four supplementary diet-related variables (e.g., weight-goal effort) were analysed in this subsample[35]. Because of the reduced sample size, interaction effects (prime condition variable x restraint variable) were not explored.

Results

Preliminary analyses. The means, standard deviations and correlations among all Study 2 variables are presented in Table 12. In this section, I only discuss correlations that are not mentioned elsewhere. It is noteworthy that the correlations involving the LDT-variables have been performed with log-transformed data, but that the descriptive statistics have been calculated with the non-transformed data.

First, to ascertain their use as covariates, the correlations with participants' age and BMI were explored. Participants' BMI correlated negatively with their weight satisfaction and how fast they approached diet words in the LDT. For this reason, participants' BMI was controlled for in the main analyses with weight satisfaction and LDT-approach diet words, as the dependent

[35] As above, none of the four diet dependent variables were normally distributed (all Kolmogorov-Smirnov tests $p < .05$), but the sample size ($N = 89$) meant that this violation was not problematic.

Table 12
Correlation Matrix and Descriptive Statistics for all Study 2 Variables

		1	2	3	4	5	6	7	8	9	10	11	12	13
1	Restraint (RS-CD)													
2	Restraint (DIS)	.71***												
3	Age	-.05	.02											
4	BMI	.17**	.15*	.05										
5	Weight Satisfaction	-.50**	-.47***	-.02	-.43***									
6	Implicit Self-Esteem	-.08	-.08	-.05	-.07	.27**								
7	Healthy Food Choice	.17*	.15*	-.08	.04	-.01	-.00							
8	Av. Sav. Food words	-.08	-.22*	-.05	-.06	.03	.00	.17†						
9	Av. Sweet Food words	-.06	-.03	.14	-.09	-.04	-.17†	-.03	.08					
10	Av. Diet words	-.04	-.13	-.06	.10	-.04	-.18*	.06	.23*	.43***				
11	App. Sav. Food words	.08	-.00	.19*	-.02	-.03	-.01	-.04						
12	App. Sweet Food words	-.04	-.07	.01	-.10	.01	.03	-.06		.		.15*		
13	App. Diet words	-.19*	-.14	-.15	-.24**	.08	-.02	-.08				.32***	.29**	
	M	7.76	19.18	20.33	22.98	5.63	7.04	2.84	709.71	663.80	694.79	718.07	680.43	717.60
	SD	3.32	6.17	3.73	2.90	2.36	1.51	1.29	111.00	60.52	61.31	83.30	67.21	75.37

Note. For all six LDT analyses, participants' neutral word reaction time has been controlled for. Furthermore, the sample size for the LDT analyses is smaller than the sample size for the other analyses—there were 127 participants in the Avoidance-condition, and 132 participants in the Approach-condition. All r-values < .001 have been rounded to .00.
†$p < .10$, *$p < .05$, **$p < .01$, ***$p < .001$.

variables. As reported in the cross-sectional analyses[36] (Chapter 2), participants' BMI also correlated significantly and positively with both (highly correlated) restraint scores. Additionally, participants' age correlated positively with how fast they approached savoury food words in the LDT. Consequently, age was controlled for in the appropriate analyses.

As would be expected, some of the LDT variables also correlated significantly with each other. Participant's avoidance of both types of food (sweet and savoury words) correlated positively with their avoidance of the diet words. This pattern was also present within the approach sample. Participants' reaction times to approach the diet words correlated positively with their reaction times to approach the food words. In addition, participants' reaction times toward the sweet food words correlated positively with their reaction time toward the savoury food words.

Further, participants' weight satisfaction correlated positively and significantly with their implicit self-esteem. Participants' implicit self-esteem also correlated negatively with their avoidance of diet words and sweet food words (marginal significance) in the LDT. Apart from a marginally significant correlation between healthy food choice and speed of avoiding savoury words in the LDT, there were no statistically significant correlations between participants' healthy food choice and the other variables.

LDT exploratory analyses. A series of HMR analyses (using SPSS GLM) were conducted to investigate whether or not instruction set (approach vs. avoid words) had a significant main effect on participants' reaction times toward the three LDT-variables. Interaction effects (instruction variable x restraint variable) were also tested to consider whether or not restrained eaters were: (a) significantly faster to approach, rather than avoid the diet words in the LDT, and/or (b) significantly faster to avoid, rather than approach the sweet and savoury food words. Multicollinearity between the interaction term (above) and variables within the

[36] As in Study 1, *r*-values calculated using participants' restraint scores differ slightly between this chapter and those reported in Chapter 2 because additional participants (e.g., those of the age of 40) were excluded from these experimental analyses.

interaction term was a problem for this set of analyses (VIFs > 11.69, tolerances < .09). Mean-centering alleviated this problem (VIFs < 2.40, tolerances > .42). Relevant assumptions were tested (e.g., linearity) and no violations were detected. Notably, the covariate (i.e., participants' reaction time toward the neutral words) did not interact significantly with the instruction variable to predict any of the three dependent variables (all *p*s > 18).

Two sets of results (moderator: RS-CD or DIS scores) can be seen in Table 13. Participants' reaction time toward the neutral words was entered in Step 1, followed by the instruction variable in Step 2, restraint score (RS-CD or DIS) in Step 3 and the interaction variable (instruction variable x restraint score) in Step 4. Although only final step statistics are presented in the table, the R^2 change values are relevant for each step of the analyses. As can be seen in Table 13, after controlling for participants' reaction time toward neutral words, participants were not significantly faster to approach, rather than avoid the prime words and vice versa (Step 2). The remaining R^2 change values show that adding participants' restraint scores (Step 3) or the interaction variable (Step 4) into the models did not account for additional amounts of variance in any of the LDT-variables.

Main analyses. Two groups (RS-CD and DIS) of nine HMRs were used to analyse the data. Relevant assumptions (e.g., independence of residuals) and multicollinearity are reviewed where appropriate. Participants' reaction times to the neutral words were controlled for in all of the analyses with LDT response times as the dependent variable. In addition, participants' BMI was controlled for in the weight satisfaction and LDT-approach diet words analyses. As well, participants' age was controlled for in the analyses with LDT-approach savoury words as the dependent variable. The assumed homogeneity of regression slopes was not violated for any of the nine dependent variables. In other words, the experimental prime condition variable did not interact significantly with the covariate to predict the corresponding dependent variable (*p*s > .15). In addition, as in Study 1, no outlying datum points were detected. That is, outliers were

Table 13
Interactive Effects of the LDT Instruction Variable and Participants' Dietary Restraint Status on the LDT Dependent Variables in Study 2

		R^2 change	df	F	β	b	p
Reaction Time toward Diet Words							
1	Neutral Word Reaction	.65***	1, 254	470.12	0.81	0.90	.00
2	Instruction Condition	.00	1, 254	0.28	-0.02	-0.00	.60
3	RS-CD	.00	1, 254	0.19	-0.03	0.00	.66
4	Instruction x RS-CD	.00	1, 254	0.83	-0.05	-0.00	.36
Reaction Time toward Sweet Food Words							
1	Neutral Word Reaction	.68***	1, 254	554.35	0.84	0.98	.00
2	Instruction Condition	.00	1, 254	1.95	-0.05	-0.01	.16
3	RS-CD	.01	1, 254	0.49	-0.04	0.00	.49
4	Instruction x RS-CD	.00	1, 254	0.09	0.02	0.00	.77
Reaction Time toward Savoury Food Words							
1	Neutral Word Reaction	.38***	1, 254	156.28	0.63	0.80	.00
2	Instruction Condition	.00	1, 254	0.31	-0.03	-0.00	.58
3	RS-CD	.00	1, 254	0.85	-0.07	-0.00	.36
4	Instruction x RS-CD	.00	1, 254	1.47	0.09	0.00	.23
Reaction Time toward Diet Words							
1	Neutral Word Reaction	.66***	1, 254	484.96	0.81	0.91	.00
2	Instruction Condition	.00	1, 254	0.42	-0.02	-0.00	.52
3	DIS	.01	1, 254	2.17	-0.08	-0.00	.14
4	Instruction x DIS	.00	1, 254	0.00	-0.00	-0.00	.98
Reaction Time toward Sweet Food Words							
1	Neutral Word Reaction	.69***	1, 254	555.66	0.83	0.97	.00
2	Instruction Condition	.00	1, 254	1.77	-0.05	-0.01	.19
3	DIS	.00	1, 254	0.13	-0.02	0.00	.72
4	Instruction x DIS	.00	1, 254	0.10	-0.02	0.00	.75
Reaction Time toward Savoury Food Words							
1	Neutral Word Reaction	.39***	1, 254	158.62	0.62	0.79	.00
2	Instruction Condition	.00	1, 254	0.36	-0.03	-0.00	.55
3	DIS	.01	1, 254	5.81	-0.16	-0.00	.02
4	Instruction x DIS	.01	1, 254	2.50	0.11	0.00	.12

Note. Apart from the R^2 change values, all other values are taken from the last step of each analyses. Any values < 0.001 have been rounded to 0.00. *p < .05, **p < .01, ***p < .001.

defined as points greater than three standardised residuals from the regression line with Cooks Distance greater than one (Newton & Rudestam, 1999; Tabachnick & Fidell, 2001).

A breakdown of the between-condition descriptive statistics for the dependent variables is in Table 14. The results of the main analyses are in Tables 15 and 16. As in Study 1, the statistics presented in these tables are final step statistics concerning the interaction effects. Nevertheless, to aid interpretation of any main effects (prime condition or restraint variable) the R^2 change values are relevant to each specific step.

Main effects: Experimental prime conditions. The experimental prime condition variable (entered in Step 1 or Step 2) did not significantly affect eight of the nine dependent variables (Tables 15 and 16). However, there was a statistically significant main effect on participants' reaction times to approach sweet food words in the LDT (see Table 14 for descriptive statistics). Post-hoc analyses (Bonferroni) compared the adjusted means (after controlling for neutral word reaction time) across the experimental conditions. Participants in the Neutral- and Control-conditions behaved differently to one another ($p = .02$). Compared to participants exposed to the Neutral-images, those exposed to the Control-images (beauty products without the IBM) were faster to approach sweet food words. Participants in the IBM-condition did not behave significantly differently to participants in the Control- ($p = .31$) or Neutral-condition ($p = .87$).

Main and interaction effects: Restraint Scale–concern for dieting subscale. There were problems with multicollinearity between the interaction variable and the two variables within the interaction variable (condition variable and restraint variable) for all dependent variables (VIFs > 14.33, tolerances < .07). Mean-centering alleviated this problem (VIFs < 2.38, tolerances > .42). None of the regression assumptions (e.g., normally distributed residuals) were detected to be violated.

Table 14
Descriptive Statistics for the Dependent Variables in Study 2

	Control		IBM		Neutral	
	Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**
Weight Satisfaction covariate: BMI	5.66	3.60	5.54	3.60	5.72	3.93
Implicit Self-Esteem	6.96	1.69	7.11	1.47	7.06	1.35
Healthy Food Choice	2.12	1.32	2.13	1.22	2.22	1.33
Av. Savoury Food words covariate: neutral word response time	692.33	139.40	701.89	143.57	702.39	153.49
Av. Sweet Food words covariate: neutral word response time	659.94	102.78	659.23	105.82	661.43	113.15
Av. Diet words covariate: neutral word response time	694.03	103.79	685.21	106.83	692.50	114.27
App. Savoury Food words covariates: age and neutral word response time	698.16	144.79	732.33	138.67	699.76	145.68
App. Sweet Food words covariate: neutral word response time	654.51	91.11	671.43	93.41	683.58	87.73
App. Diet words covariates: BMI and neutral word response time	708.95	95.93	704.92	93.87	704.54	97.54

Note. Where covariates have been controlled for, the descriptive statistics have been adjusted for the covariates' influence.

Results of these analyses are in Table 15. As in other cases, apart from the R^2 change values relevant to each step, Table 15 only contains final step statistics. In terms of the main effect participants' restraint status may have had upon the dependent variables, the β-values (if significant) from the appropriate Step (i.e., Step 2 or Step 3) are presented here in text. This measure of dietary restraint was related to participants' weight satisfaction and their healthy food choices. That is, there was a statistically significant negative relationship between participants' restraint score and their weight satisfaction (β = -0.44), and a positive relationship between their restraint score and healthy reimbursement snack choice (β = 0.18). Participants' restraint status was not significantly related to their implicit self-esteem, or to any of the LDT variables.

Weight satisfaction and implicit self-esteem. The interaction effect (experimental prime condition variable x RS-CD variable) was entered into the final step of each analysis. The interaction between participants' RS-CD scores and the experimental prime condition variable was not a significant predictor of their implicit self-esteem (R^2 change = .01, p = .20). However, for the dependent variable weight satisfaction, this interaction effect was statistically significant (R^2 change = .02, p = .04). As mentioned, because there were three experimental conditions in Study 2, three dummy variables were constructed to further probe this interaction effect. Dummy 1 compared the IBM-slope to the Control-slope, Dummy 2 compared the IBM-slope to the Neutral-slope and Dummy 3 compared the Control-slope to the Neutral-slope. New interaction variables were constructed with these dummy variables. For example, the variable created by multiplying Dummy 1 with participants' restraint score was used to test whether or not the relationship between participants' restraint score and the dependent variable weight satisfaction was different for participants who were assigned to the IBM, compared to the Control-condition (i.e., IBM-slope vs. Control-slope). These additional tests showed that the IBM-condition regression slope did not significantly differ from the Control-condition (t = 1.30, p = .20) or the Neutral-condition regression slopes (t = -1.13, p = .26). It was the Control-condition and Neutral-condition regression slopes that differed significantly (t = 2.51, p = .01).

Table 15

Interactive Effects of the Experimental Prime Condition Variable and Participants' Dietary Restraint Status (RS-CD) on the Dependent Variables in Study 2

		R^2 change	df	F	β	b	p
Weight Satisfaction							
1	BMI	.18***	2, 260	48.78	-0.35	-0.28	.00
2	Prime-condition	.00	2, 260	0.39			.68
3	RS-CD	.19***	2, 260	26.42	-0.46	-0.26	.00
4	Prime x RS-CD	.02*	2, 260	3.19			.04
Healthy Food Choice							
1	Prime-condition	.00	2, 258	0.29			.75
2	RS-CD	.03**	2, 258	3.55	0.21	0.06	.06
3	Prime x RS-CD	.01	2, 258	1.37			.26
Av. Sweet Food Words							
1	Neutral Word React.	.70***	2, 119	276.04	0.82	0.96	.00
2	Prime-condition	.00	2, 119	0.66			.52
3	RS-CD	.00	2, 119	0.07	-0.27	-0.00	.00
4	Prime x RS-CD	.02**	2, 119	5.34			.01
App. Savoury Food Words							
1	Neutral Word React.	.43***	2, 124	88.28	0.64	0.88	.00
	Age		2, 124	6.12	0.16	0.00	.02
2	Prime-condition	.02	2, 124	2.33			.10
3	RS-CD	.00	2, 124	0.01	0.01	0.00	.91
4	Prime x RS-CD	.02	2, 124	2.28			.11
App. Sweet Food Words							
1	Neutral Word React.	.67***	2, 125	266.15	0.83	0.98	.00
2	Prime-condition	.02*	2, 125	3.63			.03
3	RS-CD	.00	2, 125	1.66	-0.11	-0.00	.20
4	Prime x RS-CD	.00	2, 125	0.73			.49
Implicit Self-Esteem							
1	Prime-condition	.00	2, 261	0.24			.79
2	RS-CD	.01	2, 261	0.01	0.01	0.00	.93
3	Prime x RS-CD	.01	2, 261	1.63			.20
Av. Savoury Food Words							
1	Neutral Word React.	.36***	2, 119	65.58	0.61	0.73	.00
2	Prime-condition	.01	2, 119	0.61			.55
3	RS-CD	.00	2, 119	0.04	-0.03	0.00	.85
4	Prime x RS-CD	.01	2, 119	0.52			.60
Av. Diet Words							
1	Neutral Word React.	.71***	2, 119	269.54	0.82	0.95	.00
2	Prime-condition	.00	2, 119	0.10			.90
3	RS-CD	.00	2, 119	2.12	-0.14	-0.00	.15
4	Prime x RS-CD	.01	2, 119	2.24			.11
App. Diet Words							
1	Neutral Word React.	.61***	2, 124	177.44	0.76	0.83	.00
	BMI		2, 124	6.44	-0.15	-0.00	.01
2	Prime-condition	.00	2, 124	0.18			.84
3	RS-CD	.01	2, 124	0.21	-0.05	0.00	.65
4	Prime x RS-CD	.00	2, 124	0.19			.83

Note. Because they would not aid interpretation, neither β-values, nor b-values are given for variables that involve the three-condition prime variable. Apart from the R^2 change values, all other values are taken from the last step of each analysis. Any values < 0.001 have been rounded to 0.00. The degrees of freedom differ slightly between models because of the number of covariates or missing data. In particular, the degrees of freedom are lower in the LDT analyses because half of the total sample was allocated to each condition (avoid or approach).

*p < .05, **p < .01, ***p < .001.

Indeed, inspection of the simple slopes (Figure 5) shows that the negative relationship between participants' restraint scores and weight satisfaction was stronger for participants in the Neutral-condition (β = -0.61, t = -6.70, p < .001), compared to the Control-condition (β = -0.31, t = -4.03, p < .001). The magnitude of the IBM-condition slope fell in between (β = -0.46, t = -5.14, p < .001).

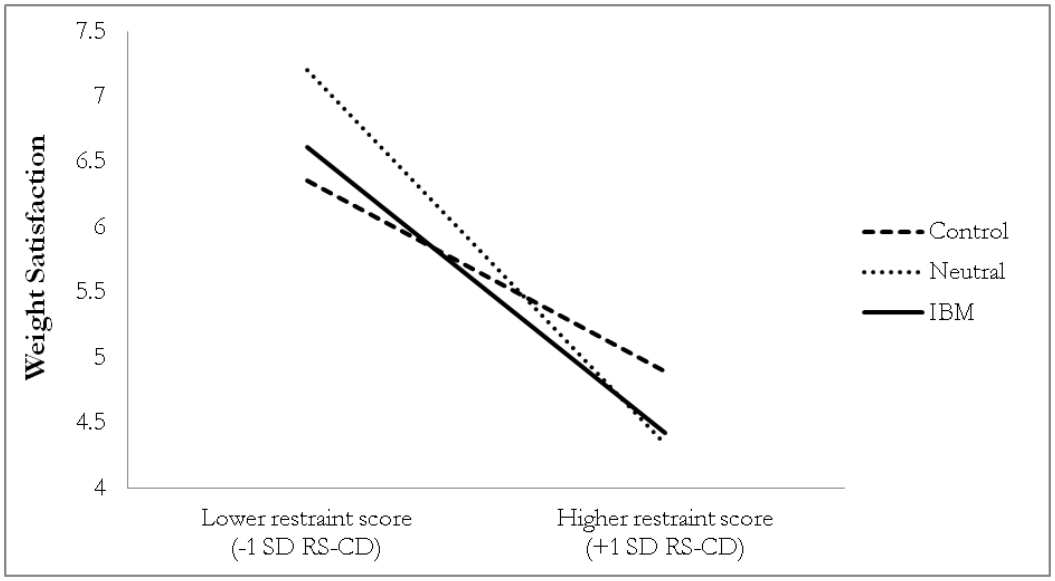

Figure 5. Interactive effect of the experimental prime condition variable and participants' dietary restraint status (RS-CD) on weight satisfaction

Healthy food choice. As can be seen in Table 15, the addition of the interaction variable to the healthy food choice model did not contribute a significant amount of variance (R^2 change = .01, p = .26).

LDT avoidance variables. The addition of the interaction variable (experimental prime condition variable x restraint variable) in Step 4 of the LDT-avoidance analyses did not account for a significant amount of variance in participants' avoidance of savoury food words or diet words (both R^2 changes < .02, ps > .11). However, adding the interaction variable to the model predicting participants' avoidance of sweet food words accounted for a statistically significant 2% of the variance (p = .01). Once again, the interaction effect (Figure 6) was probed using the dummy variables outlined above. The IBM-condition regression slope significantly differed from

both the Control-condition regression slope (t = 1.97, p = .05), and the Neutral-condition regression slope (t = 3.27, p < .001). In comparison, the Control-condition and Neutral-condition regression slopes did not significantly differ from one another (t = -1.35, p = .18). Simple slope analyses (Sibley, 2008) established that there was a statistically significant negative relationship between participants' restraint scores and their reaction time to avoid sweet food words in the IBM-condition (β = -0.27, t = -2.93, p < .001). This implies that high restraint scores were related to fast avoidance of these food words. In contrast, this relationship (restraint score and reaction time) was not statistically significant in the Neutral- (β = 0.13, t = 1.61, p = .11) or Control-condition (β = -0.03, t = -0.33, p = .74).

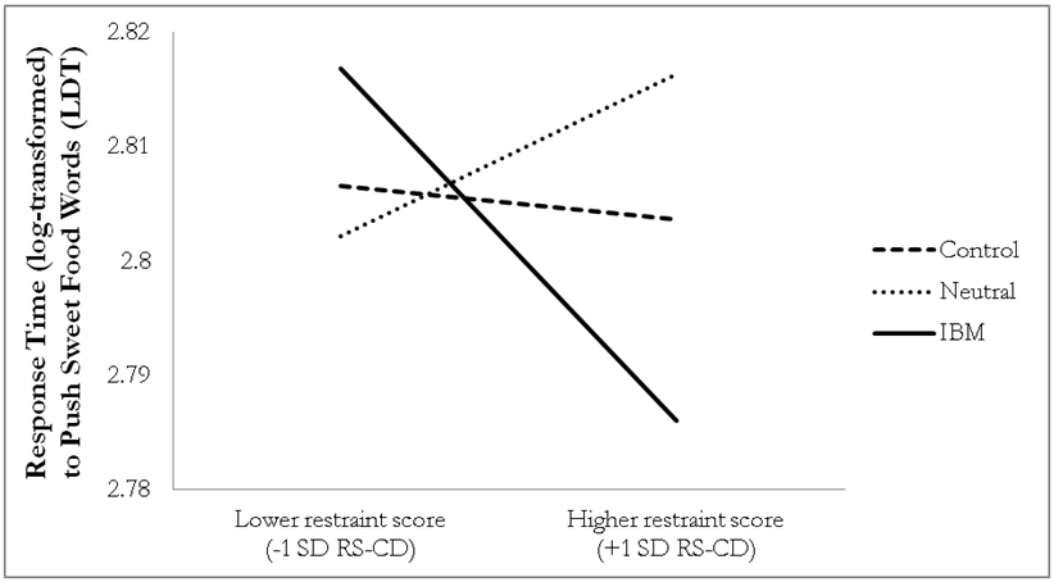

Figure 6. Interactive effect of the experimental prime condition variable and participants' dietary restraint status (RS-CD) on LDT response time to push/avoid sweet food words

LDT approach variables. The experimental condition variable did not interact with participants' restraint status to predict any of the LDT variables in the approach sample (all R^2 changes < .03, ps > .10).

Main and interaction effects: Dietary Intent Scale. As above, multicollinearity existed between the interaction variable and the two variables within the interaction term (i.e., condition variable and restraint variable) for all dependent variables (VIFs > 15.33, tolerances < .07).

Mean-centering alleviated this problem (VIFs < 1.91, tolerances > .53). No other violations occurred (e.g., residuals were normally distributed).

In terms of the main effect of participants' restraint status, there were significant relationships between their DIS scores and their weight satisfaction, avoidance of savoury food words in the LDT, and healthy food choices. There was a negative relationship between participants' restraint scores and weight satisfaction (β = -0.41), and between their restraint scores and speed avoiding savoury food words in the LDT (β = -0.18). In addition, there was a significant positive relationship between their restraint scores and their healthy food choices (β = 0.16). This measure of restraint was not significantly related to participants' implicit self-esteem, their avoidance of sweet-food words and diet words or any of the three LDT dependent variables in the approach sample.

Weight satisfaction and implicit self-esteem. As can be seen in Table 16, entering the interaction effects into the weight satisfaction and self-esteem models did not explain an additional amount of unique variance (R^2 changes < .03, *p*s > .09).

Healthy food choice. Likewise, the addition of the interactions in Step 3 of the healthy food choice model did not contribute an additional amount of unique variance (R^2 change < .001, $p = .55$).

LDT avoidance variables. After controlling for participants' avoidance of neutral words in the LDT, the interaction effects that were entered in the last step of the models for the LDT-avoidance variables were not statistically significant (all R^2 changes = .01, *p*s > .20).

LDT approach variables. Likewise, on top of the other variables in the models, the interaction effects did not predict any additional variance among the LDT-approach variables (all R^2 changes < .02, *p*s > .44).

Table 16

Interactive Effects of the Experimental Prime Condition Variable and Participants' Dietary Restraint Status (DIS) on the Dependent Variables in Study 2

		R^2 change	df	F	β	b	p
Weight Satisfaction							
1	BMI	.18***	2, 260	51.13	-0.37	-0.30	.00
2	Prime-condition	.00	2, 260	0.17			.84
3	DIS	.17***	2, 260	19.41	-0.38	-0.15	.00
4	Prime x DIS	.00	2, 260	0.16			.85
Healthy Food Choice							
1	Prime-condition	.00	2, 258	0.51			.60
2	DIS	.02*	2, 258	5.29	0.24	0.05	.02
3	Prime x DIS	.00	2, 258	0.59			.55
Av. Sweet Food Words							
1	Neutral Word React.	.70***	2, 119	271.14	0.83	0.96	.00
2	Prime-condition	.00	2, 119	0.44			.52
3	DIS	.00	2, 119	0.76	-0.09	-0.00	.38
4	Prime x DIS	.01	2, 119	1.21			.30
App. Savoury Food Words							
1	Neutral Word React.	.43***	2, 124	87.41	0.64	0.89	.00
	Age		2, 124	5.41	0.16	0.00	.02
2	Prime-condition	.02	2, 124	1.94			.15
3	DIS	.00	2, 124	0.48	0.07	0.00	.49
4	Prime x DIS	.01	2, 124	0.84			.44
App. Sweet Food Words							
1	Neutral Word React.	.67***	2, 125	268.39	0.83	0.99	.00
2	Prime-condition	.02*	2, 125	3.71			.03
3	DIS	.00	2, 125	0.82	-0.07	-0.00	.37
4	Prime x DIS	.00	2, 125	0.30			.74
Implicit Self-Esteem							
1	Prime-condition	.00	2, 261	0.14			.87
2	DIS	.01	2, 261	0.30	-0.06	-0.01	.59
3	Prime x DIS	.02	2, 261	2.47			.09
Av. Savoury Food Words							
1	Neutral Word React.	.36***	2, 119	73.90	0.62	0.74	.00
2	Prime-condition	.01	2, 119	0.71			.49
3	DIS	.03*	2, 119	0.01	0.01	0.00	.93
4	Prime x DIS	.01	2, 119	1.17			.32
Av. Diet Words							
1	Neutral Word React.	.71***	2, 119	297.83	0.85	0.98	.00
2	Prime-condition	.00	2, 119	0.10			.90
3	DIS	.01	2, 119	0.39	-0.06	-0.00	.53
4	Prime x DIS	.01	2, 119	1.64			.20
App. Diet Words							
1	Neutral Word React.	.61***	2, 124	178.72	0.76	0.83	.00
	BMI		2, 124	6.72	-0.15	-0.00	.01
2	Prime-condition	.00	2, 124	0.26			.77
3	DIS	.01	2, 124	0.26	-0.04	0.00	.61
4	Prime x DIS	.00	2, 124	0.11			.89

Note. Because they would not aid interpretation, neither β-values, nor b-values are given for variables that involve the three-condition prime variable. Apart from the R^2 change values, all other values are taken from the last step of each analysis. Any values < 0.001 have been rounded to 0.00. The degrees of freedom differ slightly between models because of the number of covariates or missing data. In particular, the degrees of freedom are lower in the LDT analyses because half of the total sample was allocated to each condition (avoid or approach).

*p < .05, **p < .01, ***p < .001.

Exploratory analyses. In Study 1, it was speculated that the IBM- and Control-conditions were too similar and that they might have affected restrained eaters' eating similarly. This speculation is why the Neutral-condition was added to Study 2. Although participants' restraint status did not interact significantly with the experimental condition variable to predict their healthy food choices, the nonsignificant interaction effects were graphed to explore this speculation. This exploratory analysis was also used to investigate if participants' implicit LDT responses mirrored their explicit "real-world" responses—i.e., avoidance of unhealthy foods.

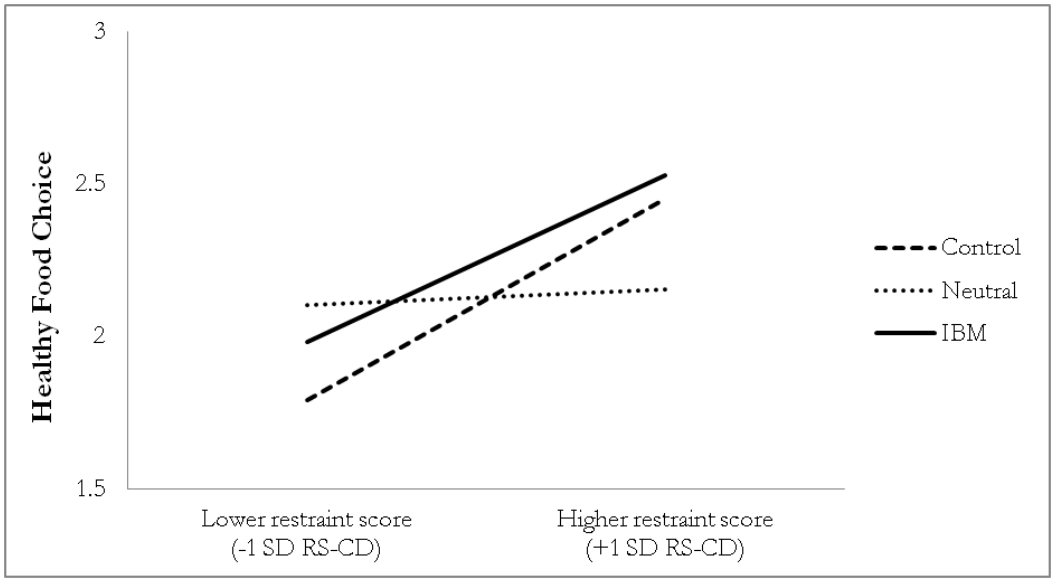

Figure 7. Exploring restrained eaters' (RS-CD) food choices within the different experimental prime conditions

Figure 7 shows that unsuccessful restrained eaters (RS-CD) who were exposed to IBM- and Control-images behaved similarly in this food choice task. That is, participants' restraint scores (RS-CD) were positively and significantly related to their healthy food choices in both conditions (IBM, $\beta = 0.21$, $t = 1.88$, $p = .06$; Control, $\beta = 0.26$, $t = 2.69$, $p = .01$). In comparison, the relationship was not statistically significant in the Neutral-condition ($\beta = 0.02$, $t = 0.18$, $p = .86$).

Healthy food choice patterns were slightly different for successful (DIS) restrained eaters (Figure 8). As above, the relationship between participants' healthy food choice and restraint

score (DIS) was positive and significant in the IBM-condition (β = 0.24, t = 2.30, p = .02). However, this relationship (restraint score and healthy food choice) was not statistically significant in the Control- (β = 0.15, t = 1.27, p = .21), or in the Neutral-condition (β = 0.09, t = 0.84, p = .41).

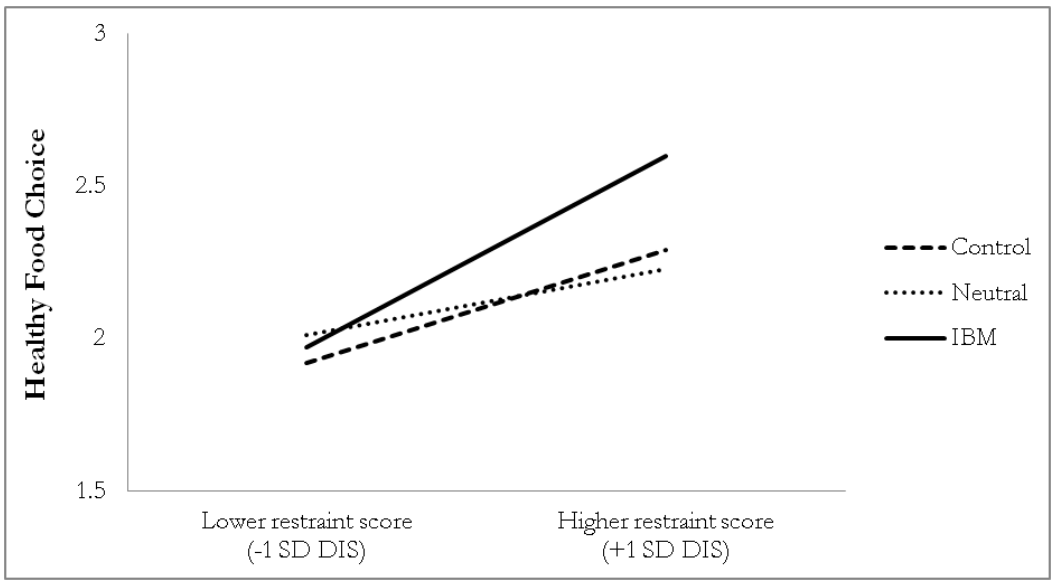

Figure 8. Exploring restrained eaters' (DIS) food choices within the different experimental prime conditions

Mediation. In Study 1, I discussed the possibility of testing the mediational pathway between restrained eaters' IBM-related negative affect and subsequent food intake. However, because the interaction effect (restraint variable x experimental prime variable) did not significantly predict participants' food intake (dependent variable) in Study 1 this model was not tested. Similar links were also checked in Study 2. However, because participants' dietary restraint status (independent variable) did not interact significantly with the experimental prime variable to predict the majority of the dependent variables (LDT-variables or participants' healthy food choices) this mediational model was not considered in Study 2 (Baron & Kenny, 1986).

Subsample: Self-reported dieters.

As outlined in the Method section, a subsample of dieters completed an additional four questions. The possible effects of the different experimental primes on the main dependent variables (above) and these additional four variables were explored with a series of ANOVAs/ANCOVAs and are discussed below.

Preliminary analyses. Correlations and descriptive statistics for all dependent variables are presented in Table 17. Dieters' age did not correlate significantly with any dependent variables. However, dieters' BMI correlated positively and significantly with their weight-loss goal (kg) and weight-goal difficulty, and negatively with their weight satisfaction. Furthermore, participants' BMI correlated positively with their reaction time to avoid diet words in the LDT (marginally significant), and negatively with their reaction time to approach diet words in the LDT (marginally significant). However, because these correlations only reached marginal levels of significance, BMI was only entered as a covariate in the three appropriate analyses—weight-loss goal, weight-goal difficulty and weight satisfaction.

Next, as the main sample, the LDT reaction-time variables correlated significantly with each other. Dieters' reaction time to avoid sweet food words correlated positively and significantly with their reaction time to avoid diet words. Similarly, there was a positive correlation between their reaction time to approach savoury food and diet words. There were two additional marginally significant positive correlations between dieters' reaction time to avoid sweet and savoury food words, and between their reaction time to approach diet and sweet food words.

There was a significant positive correlation between the amount of weight (kg) dieters reported wanting to lose and their ratings of goal effort and goal difficulty. Dieters' goal difficulty also correlated positively with their self-reported difficulty to avoid high-calorie treats.

There were also statistically significant correlations between these dieting dependent variables and the other dependent variables. First, dieters' level of weight satisfaction correlated

Table 17
Correlation Matrix and Descriptive Statistics for the Subsample of Dieters in Study 2

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Age															
2	BMI	.02														
3	Weight-Loss Goal (kg)	-.14	.59***													
4	Goal Effort	.18	.16	.23*												
5	Avoidance Difficulty	-.11	.03	.11	-.05											
6	Goal Difficulty	-.13	.27*	.38***	-.01	.55***										
7	Weight Satisfaction	.08	-.22*	-.45***	-.13	-.17	-.32***									
8	Implicit Self-Esteem	.08	-.03	-.13	.25*	.25*	-.02	.22*								
9	Healthy Food Choice	.11	-.07	-.00	.24*	-.39***	-.16	-.05	-.09							
10	Av. Sav. Food words	.15	.03	-.00	-.03	-.22	.01	.16	.08	.22						
11	Av. Sweet Food words	.12	.15	.06	.12	-.22	-.09	-.24	-.21	.05	.29†					
12	Av. Diet words	-.04	.31†	.13	.15	.07	.07	-.12	-.11	-.28†	.23	.50**				
13	App. Sav. Food words	.08	.22	.25	-.22	-.29†	.14	-.29†	-.40**	.12						
14	App. Sweet Food words	.12	-.07	-.06	-.33*	.10	.09	.10	.04	.15				.14		
15	App. Diet words	-.12	-.27†	-.15	-.37*	-.19	-.02	.07	-.13	.28†				.36*	.28†	
	M	20.02	23.62	6.82	7.09	6.24	6.74	4.26	6.97	2.30	682.51	660.13	686.23	707.35	669.51	710.34
	SD	3.03	2.67	4.03	1.68	2.52	2.27	1.87	1.69	1.24	87.49	54.83	61.70	70.61	47.78	55.60

Note. For all six LDT analyses, participants' neutral word reaction time has been controlled for. Furthermore, the sample size for the LDT analyses is smaller than the sample size for the other analyses—there were 39 participants in the Avoidance-condition, and 47 participants in the Approach-condition. All *r*-values < .001 have been rounded to .00.
†$p < .10$, *$p < .05$, **$p < .01$, ***$p < .001$.

negatively with their weight-loss goal (kg) and goal difficulty. Second, dieters' goal-effort correlated significantly and positively with implicit self-esteem and healthy food choices. Third, dieters' goal effort also correlated negatively with their reaction times to approach sweet food and diet words in the LDT. Last, dieters' difficulty avoiding high calorie treats correlated positively with their self-esteem, but negatively with their healthy food choices and reaction time to approach savoury food words in the LDT (marginally significant).

Dieters' reaction time to approach savoury food words in the LDT also correlated negatively with their weight satisfaction (marginally significant) and implicit self-esteem. Last, although both correlations were marginally significant, dieters' healthy food choices correlated negatively with their reaction time to avoid diet words, but positively with their reaction time to approach diet words.

Main effects: Experimental conditions. Seven ANCOVAs and six ANOVAs were performed to explore if the experimental prime condition variable significantly affected any of the dependent variables. As in the main sample, participants' reaction time to the neutral words was considered as a covariate in all LDT analyses. Second, as above, BMI was controlled for in the ANCOVAs with weight satisfaction, weight-loss goal (kg) and goal difficulty as the dependent variables.

Thirteen Levene tests were used to investigate the assumed homogeneity of variance for all dependent variables. Two violations occurred; the variances of the three experimental groups were not equal for the dependent variables implicit self-esteem and healthy food choice (Levene statistics > 3.43, $ps < .05$). However, because the three conditions contained a similar numbers of participants (Control: 32, Neutral: 29, IBM: 28), these ANOVAs should not have been considerably affected by these violations (Stevens, 1996).

Two additional ANCOVA assumptions were checked for the dependent variables weight-loss goal (kg), goal difficulty, weight satisfaction and LDT-reaction times (six variables). Regression lines indicated adequate linearity between each of the appropriate covariates and the

Table 18
Between-Group Differences in the Subsample of Dieters in Study 2

	Control		Neutral		IBM					
	Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**	**df**	**F**	**p**	**η^2**
Weight-Loss Goal (kg) covariate: BMI	6.61	5.47	6.80	5.85	7.09	5.85	2, 85	0.16	.85	.00
Goal Effort	7.03	1.86	6.48	1.53	7.79	1.40	2, 86	4.66	.01	.10
Avoidance Difficulty	6.16	2.70	6.24	2.50	6.32	2.42	2, 86	0.03	.97	.00
Goal Difficulty covariate: BMI	6.62	3.77	6.92	3.96	6.93	3.96	2, 85	0.50	.61	.01
Weight Satisfaction covariate: BMI	4.26	3.11	4.15	3.30	4.37	3.30	2, 85	0.10	.91	.00
Implicit Self-Esteem	6.18	1.99	6.97	1.78	7.14	1.78	2, 86	0.28	.76	.01
Healthy Food Choice	2.39	1.41	2.10	0.97	2.39	1.31	2, 85	0.51	.60	.01
Av. Savoury Food words	674.83	84.29	6.75.67	87.84	698.03	164.56	2, 36	0.02	.98	.00
Av. Sweet Food words covariate: neutral word response time	652.08	86.62	679.71	96.49	644.94	110.66	2, 35	2.22	.12	.11
Av. Diet words covariate: neutral word response time	695.06	96.17	674.86	109.54	685.98	123.03	2, 35	0.60	.56	.03
App. Savoury Food words	716.88	89.72	705.66	137.79	682.94	76.71	2, 44	0.58	.69	.02
App. Sweet Food words covariate: neutral word response time	648.79	81.79	677.85	87.27	663.70	78.77	2, 43	1.57	.22	.07
App. Diet words covariate: neutral word response time	708.97	88.16	707.57	92.55	690.16	82.95	2, 43	1.04	.36	.05

Note. Where covariates have been controlled for, the descriptive statistics have been adjusted for the covariates' influence. The degrees of freedom are lower in the LDT analyses because the sample was divided into one approach and one avoidance condition.

dependent variables. Furthermore, the majority of regression slopes were homogeneous. That is, the experimental condition variable and the appropriate covariate did not significantly interact to predict the majority of the dependent variables. However, two violations occurred. The experimental condition variable significantly interacted with participants' reaction time toward the neutral words in the LDT to predict participants' response times to both approach and avoid savoury food words (Fs > 4.24, ps < .02). Consequently, this covariate was not entered into the models that were used to predict these two dependent variables (Stevens, 1996).

As can be seen in Table 18, regardless of which experimental condition dieters were in they reported similar weight-loss goals (kg), difficulty avoiding temptations and goal difficulty. Similarly, their weight satisfaction, implicit self-esteem, healthy food choices and their LDT reaction times were not significantly influenced by being in different conditions.

However, the experimental prime condition variable did significantly affect dieters' intended weight-goal effort. Bonferroni post-hoc testing was used to probe the significant effect. There was a statistically significant difference between dieters' weight-goal effort in the IBM- and Neutral-conditions (p = .01). In comparison, the difference between dieters' weight-goal effort did not significantly differ between the IBM- and Control-conditions (p = .23), or between the Control- and Neutral-conditions (p = .57). Therefore, dieters exposed to IBM reported that they were willing to invest significantly more effort toward achieving their goal than participants in the Neutral-condition did (Table 18).

Discussion

Regardless of the which experimental condition participants were assigned to, their dietary restraint status (DIS and RS-CD) was related to lower weight satisfaction and choosing healthier reimbursement snacks. Additionally, although not a main hypothesis, in line with Fishbach and Shah's (2006) research it was expected that, regardless of being in different experimental conditions, compared to unrestrained eaters, restrained eaters would be faster to approach (slower to avoid) diet words and faster to avoid (slower to approach) tempting food

words in the LDT. One statistically significant main effect was consistent with this hypothesis in the main sample. The higher participants scored on the DIS, the faster they avoided savoury food words in the LDT. Contrary to Fishbach and Shah's reasoning and research, exploratory regression analyses demonstrated that restrained eaters were not significantly faster to approach, rather than avoid, diet words, nor were they significantly faster to avoid, rather than approach food words.

The experimental prime condition variable significantly affected two of the dependent variables. First, compared to participants in the Neutral-condition, those in the Control-condition were significantly faster to approach sweet food words in the LDT. Second, the prime condition variable significantly affected dieters' self-reported weight-goal effort in the subsample of dieters. Consistent with the overriding hypothesis (i.e., that IBM serves as some kind of trigger for dietary restraint), in comparison to those in the Neutral-condition, dieters exposed to IBM reported wanting to expend significantly more effort toward achieving their weight-loss goal.

Nevertheless, in Study 2 the overriding goal was to investigate the hypothesised interaction effects between the experimental prime condition variable and participants' dietary restraint status in the main sample of participants. In line with control theory, IBM-exposure was hypothesised to cause restrained eaters to feel negative, to approach their diet goals (words) and to avoid tempting food (words and unhealthy food choices). First, the statistically significant self-evaluation results obtained in Study 1 were not replicated in Study 2. Compared to restrained eaters in the comparison conditions, restrained eaters in the IBM-condition did not report a statistically significant lower amount of weight satisfaction or implicit self-esteem. Second, regardless of which restraint variable was included in the analyses (DIS or RS-CD), participants' restraint status did not significantly interact with the experimental condition variable to predict their response times to approach or avoid the diet words in the LDT. Third, unsuccessful (RS-CD), but not successful (DIS) restrained eaters in the IBM-condition avoided the sweet (but not

savoury) food words in the LDT significantly faster than other participants. Last, participants' restraint status did not significantly interact with the experimental condition variable to predict their healthy food choices. However, exploratory analysis indicated that compared to unrestrained eaters, unsuccessful and successful restrained eaters tended to make healthier choices after IBM- (and Control-image) exposure.

Therefore, counterintuitive to control theory, although the data insinuate that IBM did not negatively affect restrained eaters' self-evaluations, the images encouraged some restrained eaters to avoid sweet high-calorie foods. In line with previous research (Fishbach et al., 2003; Shah et al., 2002), the results suggest that deliberate acts of self-control (e.g., Study 2 healthy food choices and Study 1 taste test results) have implicit connections (e.g., Study 2 LDT results). Consistent with part of the hypotheses drawn in this second study, IBM-exposure appears to have: (a) helped unsuccessful restrained eaters[37] avoid sweet (but not savoury) food words in the LDT and (b) helped successful and unsuccessful restrained eaters make healthy food choices[38]. Given that previous researchers (e.g., Drewnowski, 1995; Yanovski, 2003) have shown that high-calorie foods are difficult to avoid (particularly for unsuccessful restrained eaters; Stroebe et al., 2008), these effects of IBM-exposure are noteworthy.

However, the nonsignificant implicit LDT results also imply that, regardless of the (nonsignificant) self-evaluative effects, IBM-exposure did not necessarily activate restrained eaters' dieting goal. Nonetheless, the statistically significant results obtained with the explicit measure of weight-goal effort in the dieting subsample suggest otherwise. In comparison to dieters assigned to the Neutral-condition, those exposed to IBM reported significantly more

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[37] As in the Results section, when using participants' DIS, rather than RS-CD scores, the interaction effect (condition variable x restraint variable) did not contribute a significant amount of variance to the model with LDT-sweet word avoidance as the dependent variable. Likewise, exploratory simple slopes were nonsignificant (*p*s > .29). However, exploratory analyses showed that the significant effect obtained for unsuccessful restrained eaters (RS-CD) was somewhat similar for successful restrained eaters (DIS) exposed to IBM-images. That is, restrained eaters (DIS) tended toward avoiding the sweet food words faster than others did.

[38] Only the simple slopes, rather than the interaction effects (condition variable x restraint variable) reached significance.

weight-goal effort. On the one hand, this pattern of nonsignificant and significant findings might imply that viewing IBM affects explicit, rather than implicit goal connections. On the other hand, because explicit measures are more vulnerable to be affected by social desirability and/or demand characteristics, dieters may have felt some pressure to rate their weight-goal effort highly after IBM-exposure. I did not employ deception to separate the dieting dependent variables from the experimental manipulation in Study 2, I account for this limitation in Study 3.

Limitations. First, as in Study 1, it is possible that the obtained results might have been different had I included obese (and suspicious) participants in the analyses. However, although not reported in the Results section, the obtained significance levels were not affected when these participants were included in the main analyses. Second, the LDT was a novel way to test participants' approach and avoidance tendencies after IBM-exposure. If the significant LDT result is replicable, it may have provided valuable insight into restrained eaters' IBM-related behaviour. However, it is difficult to compare Study 2's LDT results to other studies in which researchers assess restrained eaters' actual food intake. Considering that olfactory cues (i.e., smell) encourage restrained eaters to approach palatable food (Fedoroff et al., 1997; Fedoroff, Polivy, & Herman, 2003), food-cue exposure may be an important variable that Study 2 lacked.

The healthy food choice test provided some validation of the significant LDT results. For instance, just as restrained eaters (RS-CD) chose significantly healthier snacks when exposed to IBM (Figure 7), compared to other participants, restrained eaters were also significantly faster to avoid unhealthy (sweet) food words in the LDT (Figure 6). Similarly, restrained and unrestrained eaters' healthy food choices (Figure 7) and avoidance of unhealthy food words (Figure 6) did not significantly differ in the Neutral-condition. However, the Control-slopes did differ between the implicit (LDT) and explicit (food choice) measures (Figures 6 and 7). That is, although participants' restraint status significantly influenced their healthy food choice (Figure 7) in the Control-condition, it did not significantly affect restrained eaters' avoidance of unhealthy food words (LDT) in the Control-condition (Figure 6). However, the healthy food choice test

still lacked olfactory cues and was possibly influenced by socially desirable responding. Participants knew that the experimenter would look at the food choices before the study ended (i.e., to determine whether or not participants chose a can or Coke or vegetable juice as reimbursement). Consequently, especially because it was touted as a task performance measure, restrained eaters might have felt obliged to choose healthy snacks. Therefore, I eliminated the healthy food choice test in Study 3, and instead included a taste test ***and*** the joystick LDT.

Third, unlike Study 1, I designed Study 2 to be without a pre-test questionnaire and a two-study pre-text that separated the independent and dependent variables. In Study 1, the questions in the pre-test questionnaire were used to reinforce the cover story, gather pre-manipulation measures and to measure participants' restraint status (DIS). The pre-test questionnaire was eliminated from Study 2 for a few reasons. Namely, the questions within the pre-test may have caused weight-dissatisfied participants to drop out of Study 1, and it was difficult recruiting participants for a two-part study. In addition, a two-study cover story was deemed unnecessary in Study 2 because the main dependent variable (LDT) was implicit. However, because pre-manipulation measures of participants' weight satisfaction and self-esteem were not collected in Study 2, the current study had less statistical power to detect effects than Study 1 had (Bonate, 2000). Effect sizes are larger when pre-test measures are included in IBM-studies (Want, 2009). In addition, unlike Study 1, the participants completed both restraint scales at the end of Study 2 after IBM-exposure and the measurement of the dependent variables. Although restraint scales are generally stable measures (e.g., Klesges, Klem, Epkins, & Klesges, 1991; Stice, 1998) and should not be influenced by the foregoing experiment, this unintended influence remains a possibility. Such limitations were attended to in Study 3.

Summary. Considering such limitations, it is hard to know whether or not the data were consistent with the hypotheses and with control theory. My results imply that restrained eaters exposed to IBM behaved in line with the theory (i.e., self-regulation), but that negative affect (as I measured it) may have been unnecessary for self-regulation. In saying that, the self-evaluation

measures in Study 2 were limited by the post-test only design. Consequently, the measures may not have been sensitive enough to detect restrained eaters' negative self-evaluations after IBM-exposure. I attempted to clarify restrained eaters' behaviour in Study 3.

Chapter 5

Study 3 Experimental Analyses

The data gathered in Study 1 suggested that IBM-exposure negatively affected restrained eaters' (RS-CD and DIS) mood (measured implicitly) and weight satisfaction. Nevertheless, participants' restraint status and the experimental condition variable did not interact to predict their subsequent food intake during a taste test. In Study 2, IBM-exposure did not significantly affect participants' self-evaluations (participants' mood was not measured in Study 2) differently than the comparison images did. Regardless, IBM-exposure led unsuccessful restrained eaters (RS-CD) to avoid sweet food words in a LDT significantly faster than unrestrained eaters and participants in the comparison conditions. The results obtained in further exploratory analyses in Study 2 showed that there was a positive relationship between participants' restraint scores (RS-CD and DIS) and healthy food choices in the IBM- (and Control-) condition, but not in the Neutral-condition. Last, in Study 2, additional exploratory analyses demonstrated that the subsample of self-reported dieters reported significantly higher levels of intended weight-goal effort if they had been exposed to IBM, rather than comparison images.

These findings are tentatively in line with the hypothesis that I formulated in Chapter 3, that (based upon control theory) attentive IBM-exposure triggers negative affect and goal thoughts among restrained eaters, which prompts dietary restraint (Study 1) or avoidance of tempting foods (Study 2 LDT and healthy food choice). However, these findings differ from some previous researchers' findings that restrained eaters identified with the RS consume more food after IBM-exposure than do unrestrained eaters and/or restrained eaters in a comparison condition (Mills et al., 2002; Seddon & Berry, 1996; Strauss et al., 1994; Warren, Strauss et al., 2009). Aside from differences in restraint measurement, one clear difference between the current studies and most previous IBM-eating research is the difference in attention participants were paying to the IBM-stimuli. As discussed in Chapter 3, in order to remind (unsuccessful and successful) restrained eaters of their goal, perhaps they need to pay a high amount of attention to

the IBM. If that is not the case (e.g., when IBM is embedded in television commercial breaks; Strauss et al., 1994), IBM-exposure may encourage unsuccessful restrained eaters (RS) to eat. Therefore, in the present study, the main aim was to manipulate IBM-related attention and examine the effect (if any) being in the different experimental conditions has upon restrained eaters' self-evaluation, diet goal and eating behaviour/intentions.

Manipulating IBM-Attention

Some research groups have manipulated the amount of social comparison that participants engage in when viewing IBM-stimuli, thereby unintentionally manipulating IBM-related attention levels. For example, some researchers explicitly instruct one group of participants to compare themselves with the models in the IBM (e.g., Cattarin, Thompson, Thomas, & Williams, 2000; Tiggemann & McGill, 2004; Tiggemann & Slater, 2004). Consequently, this group of participants pay more attention to IBM than the participants in the distraction and/or no comparison group do. Cattarin et al. (2000) found that participants in the social comparison condition were significantly more dissatisfied with their appearance than were participants assigned to the Distraction- or Neutral-conditions. Furthermore, as noted in Chapter 1, Tiggemann and her colleagues (e.g., Tiggemann & McGill, 2004; Tiggemann & Slater, 2004; Tiggemann et al., 2012) reported that the amount of social comparison recounted by participants (partially) mediated the link between IBM-exposure and negative mood/body dissatisfaction.

However, Want (2009) argued that providing participants with explicit social comparison instructions triggers deliberate and conscious (vs. automatic) comparisons, which possibly initiate self-defensive thinking and may lack real-world application. For the present study, it was important that the manipulation of attention was not confounded with social comparison tendencies. For example, a handful of previous researchers have investigated IBM-attention without manipulating participants' social comparison tendencies (e.g., Brown & Dittmar, 2005; Jansen & de Vries, 2002; Joshi et al., 2004).

In the first study, Jansen and de Vries (2002) investigated pre-attentive IBM-exposure. They subliminally primed restrained and unrestrained eaters (RS) with IBM or comparison images. Subliminally viewing IBM did not significantly affect participants' self-esteem, their mood or their food intake. Therefore, Jansen and de Vries concluded that pre-attentive IBM-exposure did not affect women (including restrained eaters). Although the aim of Jansen and de Vries' study was to simulate distracted IBM-attention, one could argue that subliminal priming is not the same as distracted attention in the real world. When participants watch television or flick through a magazine, their recognition of IBM is unlikely to happen entirely outside of conscious awareness. It is also noteworthy that Jansen and de Vries did not include a normal attention (vs. pre-attentive) comparison condition. In a subsequent study, Joshi et al. (2004) exposed participants to a Control-condition, a pre-attentive IBM-condition or a normal-attention IBM-condition (7 s per image). Again, this pre-attentive priming is not synonymous with distracted real-world attention. In addition, the two IBM-conditions did not affect participants in significantly different ways, and Joshi et al. subsequently combined these conditions to form one IBM-condition[39].

In another study, Brown and Dittmar (2005) manipulated participants' IBM-related attention. Unfortunately, participants' restraint status was not measured, so comparisons with the present studies' data are limited. Brown and Dittmar noted that a Low-Attention-condition should require a small level of conscious engagement with the images. Therefore, unlike the participants in Jansen and de Vries' (2002) and Joshi et al.'s (2004) studies, all of the participants in Brown and Dittmar's study were made consciously aware of the IBM. Participants in the Low-Attention-condition received instructions not to focus on the IBM-slides: "pay as little attention as possible to the quick flashes" (p. 1096). In comparison, those in the Attention-condition saw

[39] Participants' restraint status (RS) was measured in this study; however, statistically significant effects were only obtained for restrained eaters when the two IBM (pre-attentive and normal-attention) conditions had been combined. Therefore, such results are not relevant for the present attention-related discussion.

the same five slides for 10 s each, concentrated on each image and completed an associated memory test.

Similar to the reasoning I discussed in Chapter 3 (i.e., high IBM-attention triggering negative social comparisons), Brown and Dittmar (2005) hypothesised that the explicit and attentive processing instructions would trigger significantly more appearance anxiety than the implicit and less attentive instructions would trigger. Their findings were partly consistent with their expectations. Participants in the Attention-condition did report heightened weight-focused anxiety, whereas this effect was not statistically significant in the Low-Attention-condition. However, regardless of the attention condition, appearance schemas were activated among all participants. Appearance schemas are cognitive structures that coordinate and process appearance information, and are related to body dissatisfaction (Cash & Labarge, 1996; Hargreaves & Tiggemann, 2002). It is possible that the Low-Attention-condition was confounded by the IBM-viewing instructions. That is, requesting participants not to focus on certain stimuli may heighten that focus ("white bear" suppression effect; Wegner, 1994). In this case, because participants in Brown and Dittmar's Low-Attention-condition were asked not to focus on the IBM, participants may have unintentionally focused on the images. I attend to this limitation in this third and final study.

The Present Study

The main aim in Study 3 was to simulate the attention-related differences between past IBM-eating studies. That is, distracted or inadvertent IBM-exposure (e.g., commercial breaks during a film) vs. attentive or advertent IBM-exposure (e.g., a slideshow). However, rather than expose some participants to a slideshow and some to a film, participants in the inadvertent and the advertent IBM-conditions were both exposed to exactly the same stimuli via the slideshow used in Studies 1 and 2. This manipulation ensured that the experimental stimuli were kept constant between the attention conditions. In light of previous suggestions (e.g., Want, 2009), participants' social comparison tendencies were not manipulated. Additionally, unlike Brown and

Dittmar's (2005) study—to avoid the "white bear" suppression effect—participants in the Inadvertent-Attention-conditions were not given any processing instructions.

In addition to this attention manipulation, a number of changes were made in Study 3. As suspected after analysing Study 1's data, restrained eaters in Study 2 who were exposed to IBM- and Control-images chose similarly in the healthy/unhealthy food choice test. Although this test may have been affected by social desirability, this pattern still suggests that IBM- and Control-images might affect participants' eating-related behaviour similarly (see also Monro & Huon, 2006). Because of this similar effect, the Control-condition (i.e., IBM-slides with the thin models digitally removed, Appendix I) was excluded from Study 3. Therefore, in Study 3, participants were only exposed to IBM- or Neutral-images. Second, to test whether or not the LDT results (avoidance of high-calorie food words) mimicked real-world behaviour, I included both the LDT and a taste test in Study 3. However, unlike Study 2, participants only completed the stimuli avoidance (rather than approach) LDT in this third study. In other words, participants were instructed to push the joystick in response to real words and pull the joystick in response to fake/pseudo-words. Elimination of the approach LDT occurred because I did not find any statistically significant interaction effects (experimental prime condition variable x restraint status) among participants in the approach sample in Study 2. Third, as in Study 1, I included a pre-test questionnaire and two-study pre-text in Study 3. However, compared to Study 1, the pre-test questions were not focused on eating and appearance and I included extensive filler items in the questionnaire. Additionally, the taste test design was improved from Study 1 to Study 3. Participants in Study 3 thought the study was about the five human senses. Once in the laboratory, these participants ***randomly assigned themselves*** to a taste, rather than smell, sight, touch or sound condition. Therefore, participants did not arrive at the laboratory definitely expecting to eat. In Study 1, eating was made salient to participants before arriving at the laboratory. Because Study 1 was supposedly about hunger and memory, the participants were specifically asked not to eat 2-hours before arrival at the laboratory, and the online pre-test

questions were focused upon eating behaviour. Moreover, following other researchers (e.g., Jansen & de Vries, 2002), participants in Study 3 were only tested between 11am and 6pm. It was possibly a limitation of Study 1 that participants were tested between 9am and 5pm. Early-morning participants probably did not feel like eating M&Ms[40]. Last, in Study 3, participants had a variety of unhealthy foods to consume (e.g., Strauss et al., 1994). Whereas, in Study 1 participants only had M&Ms. It is possible that this lack of food choice/variety was a limitation in Study 1, and the variety of food in Study 3 was intended to be more realistic.

Self-evaluation hypotheses. As in my previous experiments, regardless of the experimental prime condition variable and the specific measure of dietary restraint status, participants with higher restraint scores were hypothesised to report significantly lower self-evaluations than others. Statistically significant interaction effects were hypothesised to qualify these main effects. Of the IBM-researchers that have included participants' dietary restraint status as a potential moderator, my first experiment (Study 1) has been the only study in which restrained eaters (RS-CD and DIS) reported significantly higher negative self-evaluations and mood after IBM-exposure. In Chapter 3, it was argued that memorising the IBM caused restrained eaters in Study 1 to internalise the images and highlight the discrepancies between their own bodies and the models' bodies. Thus, participants' attention level during the experimental manipulation seemed like an obvious difference between the studies finding no self-evaluative or mood effects/positive effects, and the negative effects obtained in Study 1. Based upon the cross-sectional analyses (Chapter 2), successful (DIS) and unsuccessful (RS-CD) restrained eaters' self-evaluations were expected to be similarly affected by IBM-exposure.

[40] The interaction effect (experimental prime condition variable x dietary restraint status) for the taste test was re-tested in Study 1 without early-morning participants (9am-11am). Although the effects (DIS and RS-CD) remained unchanged ($ps > .31$), it is hard to know if this nonsignificant result was an artefact of reduced statistical power or not.

Therefore, mirroring Study 1[41], in comparison to unrestrained eaters in the advertent IBM-condition and/or restrained eaters in the Neutral-condition, in Study 3 I hypothesised that restrained eaters in the IBM-Advertent-condition would report statistically lower (i.e., more negative) self-evaluations (weight satisfaction and implicit self-esteem). This hypothesis aligns with Brown and Dittmar's (2005) original hypothesis and the previous social comparison/control theory reasoning laid out in Chapter 3. In comparison, restrained eaters in previous studies have not reported negative effects (self-evaluation/mood) after inadvertent IBM-exposure (e.g., Anschutz, Engels et al., 2009; Strauss et al., 1994; Warren, Strauss et al., 2005). Therefore, in comparison to restrained eaters in the Neutral-condition and/or unrestrained eaters in the inadvertent IBM-condition, it was hypothesised that restrained eaters in the inadvertent IBM-condition would not report experiencing significantly different self-evaluations. In other words, I hypothesised that negative self-evaluations would only be reported by restrained eaters in the advertent IBM-condition. Therefore, I expected to find significant 3-way interaction effects for the dependent variables weight satisfaction and self-esteem (experimental prime variable x attention condition variable x restraint variable).

Eating-related hypotheses. I included six outcome measures of behavioural dietary restraint in Study 3: LDT variables (avoidance of sweet/savoury food words), taste-test variables (consumption of sweet and savoury food) and one healthy eating intention variable. Additionally, although not strictly restraint-related, participants' avoidance of diet words in the LDT was the sixth measure. Here, restraint would be evidenced by slow diet-word avoidance. In comparison to the self-evaluation hypotheses, for the eating-related hypotheses, it is important to differentiate between the two restraint scales (RS-CD and DIS). Based upon control theory (Chapter 3), negative self-evaluative effects (triggered by attentive IBM-exposure) should encourage restrained eaters' dietary restraint. However, when comparing the results of Studies 1

[41] Although the self-evaluation results in Study 1 were not replicated in Study 2, this may have been due to the post-test only design. For this reason, in line with Study 1's results, the original reasoning—high IBM-attention triggers significant negative effects among successful (DIS) and unsuccessful (RS-CD) restrained eaters—has been maintained.

and 2 to previous literature, it seems that unsuccessful restrained eaters (RS or RS-CD) behave most in line with control theory. For instance, in comparison to previous research (e.g., Strauss et al., 1994), the significant and nonsignificant results of Studies 1 and 2 imply that unsuccessful restrained eaters restrict their eating (or avoid unhealthy food/words) if they have paid advertent or full attention to the IBM (i.e., slideshow and memory test) and reported negative self-evaluative/mood effects. On the flipside, and also consistent with control theory, when unsuccessful restrained eaters pay less than full attention to the IBM they do not report negative effects and eat significantly more than other participants eat[42] (Mills et al., 2002; Seddon & Berry, 1996; Strauss et al., 1994; Warren, Strauss et al., 2005).

In comparison, drawing upon control theory does not seem to predict successful restrained eaters' (DEBQ-R or DIS) IBM-related behaviour as precisely. For instance, in Study 1 successful restrained eaters paid advertent attention to IBM and reported statistically significant negative effects. In addition, they showed signs of self-regulation in the taste test in Study 1 (i.e., not eating more than others) and the healthy food choice test in Study 2. However, in previous research, successful restrained eaters *also* display signs of self-regulation while paying inadvertent attention to IBM and not reporting statistically significant negative self-evaluations or mood (Anschutz, Engels et al., 2009; Anschutz, van Strien et al., 2008). Therefore, successful restrained eaters' IBM-related eating does not seem to be as influenced by how much attention they pay to IBM or by their IBM-related self-evaluations.

In summary, the argument presented here bears resemblance to the argument made in Chapter 3 after Study 1 (i.e., that advertent IBM-exposure triggers weight-goal effort/dietary restraint). However—after drawing detailed (attention-related) comparisons between the current research and previous research—the argument is now dependent upon each restraint scale. In the current study participants' weight satisfaction, implicit self-esteem, avoidance tendencies

[42] The results of Anschutz, van Strien et al. (2008) exploratory analyses imply that unsuccessful restrained eaters do not overeat in such settings (i.e., inadvertent exposure). However, as previously mentioned (Chapter 3), because Anschutz, van Strien et al. controlled for restrained eaters' overeating tendencies it would have been misleading to include such results in this rationale.

(LDT), food intake (taste test) and healthy eating intentions were measured after the attention and prime manipulations. For IBM-exposure to trigger goal thoughts (LDT) and dietary restraint (LDT, taste test, eating intentions) it was hypothesised that: (a) less successful restrained eaters (RS-CD) would need to focus on the images and experience negative self-evaluations (i.e., control theory), but that (b) more successful restrained eaters (DIS) would not need to experience negative self-evaluations and, therefore, would not need focus on the images. That is, successful restrained eaters were expected to display dietary restraint after both inadvertent and advertent exposure (e.g., Anschutz, van Strien et al., 2008; thesis Study 1).

Specifically, paying advertent attention to IBM was hypothesised to trigger negative self-evaluations among restrained eaters (DIS and RS-CD). In turn, in line with control theory, advertent IBM-exposure was hypothesised to activate all (RS-CD and DIS) restrained eaters' restraint goal (significantly slower avoidance of LDT-diet words than other participants) and encourage all restrained eaters' dietary restraint (measured with the taste test, LDT-food words and healthy eating intentions). In contrast, inadvertent attention to IBM was hypothesised to buffer all restrained eaters from experiencing negative self-evaluative effects. Without these negative effects, unsuccessful (but not successful) restrained eaters were not expected to think about their restraint goal (i.e., would not be significantly faster or slower than other participants to avoid LDT-diet words). In turn, compared to other participants, these unsuccessful restrained eaters who were inadvertently exposed to IBM were expected to be significantly slower to avoid food words in the LDT, to eat more during the taste test, and to report unhealthier eating intentions. In other words, I anticipated finding statistically significant 3-way interaction effects (experimental prime variable x attention variable x restraint variable) for these dependent variables.

Method

Participants. As previously outlined in Chapter 2, data were collected in three phases. Participants were recruited via email advertisements and via the Psychology participant pool

website. The advertisements publicised a study on female Personality and the Five Human Senses. Participants were offered psychology course credit or $10 NZ to complete the study. Two hundred and ninety-one female university students completed an online questionnaire (Phase 1), with 249 continuing to complete Phases 2 and 3 in the laboratory. Participants who continued past Phase 1 did not differ (age, baseline self-esteem, baseline weight satisfaction or dietary restraint status—DIS and RS-CD) significantly from participants who did not continue past Phase 1 (Table 19).

Table 19
Comparing Non-returnees and Returnees on Baseline Measures in Study 3

	Non-returnees		**Returnees**					
	Mean	**SD**	**Mean**	**SD**	**df**	**t**	**p**	η^2
Restraint (DIS)	19.26	7.87	19.30	7.09	1, 289	-0.04	.97	.00
Restraint (RS-CD)	7.38	3.48	7.73	3.63	1, 289	-0.55	.58	.00
Age	20.57	3.44	20.89	6.83	1, 289	-0.30	.77	.00
Self-esteem	6.67	2.08	6.76	1.71	1, 289	-0.32	.75	.00
Weight Satisfaction	5.12	2.76	5.29	2.59	1, 289	-0.38	.70	.00

Data from 26 participants (BMI > 30) were not analysed in the cross-sectional analyses (Chapter 2). An additional 38 participants' data were not analysed in the present experimental analyses; these were 29 suspicious participants[43], and nine participants over the age of 40. Furthermore, the data obtained from 14 participants in the Inadvertent-Attention-condition were not analysed. This was because these participants rated their attention to the prime images as 0/10, i.e., they did not see or notice any images. Participants (N = 171) had a mean age of 19.35 (SD = 2.69, range 17-39), and mean BMI of 22.94 (SD = 2.83, range 15.05-29.51). Because the

[43] Unlike in the previous two studies, no participant correctly understood the purpose of Study 3 or connected the two unrelated studies. However, these 29 participants were suspicious of the taste test and/or the dieting content in the questionnaire. The data from all 29 participants were not analysed in the main analyses because an overriding goal in these experiments was to reduce demand characteristics.

majority of participants were recruited from the Psychology participant pool, 96% of the sample was Psychology students. Seventy-eight-percent of the sample identified themselves as New Zealand European, 5% as Chinese, 5% as New Zealand European and New Zealand Māori, 2% as Indian and the remaining 10% were of other self-reported ethnicities (e.g., Australian).

Participants were randomly assigned to either the Advertent- (n = 93), or Inadvertent- (n = 78) Attention-conditions[44]. Within the Advertent-condition, 45 participants were assigned to the Neutral-condition, and 48 to the IBM-condition. Comparatively, in the Inadvertent-condition 39 participants were randomly assigned to each of the experimental conditions (IBM and Neutral). As in previous studies, although participants were randomly assigned to the conditions, participant numbers differ between conditions because exclusions (e.g., elder participants) were made after data collection. To ascertain if random assignment was successful, a series of 2 (attention condition variable) x 2 (experimental prime condition variable) ANOVAs were conducted with baseline and pre-manipulation variables as the outcome measures. Random assignment was successful within the attention conditions (Table 20 for descriptive statistics). That is, there were no statistically significant differences between participants assigned to the advertent and inadvertent attention conditions on age, BMI, restraint status (DIS and RS-CD), pre-manipulation self-esteem and pre-manipulation weight satisfaction. However, random assignment was less successful within the experimental prime conditions; participants assigned to the IBM-condition were significantly more satisfied with their weight and scored significantly lower on the DIS than those assigned to the Neutral-condition. Additionally, the attention condition variable and experimental prime condition variable significantly interacted to predict participants' BMI, $F(1, 167) = 4.11$, $p = .04$, $\eta^2 = .02$. Of the participants in the IBM-conditions, on average, those in the Advertent-condition had lower BMIs (M = 22.39, SD = 2.77), than

[44] There were fewer participants in the Inadvertent-Attention-condition due to the elimination of participants who did not see or notice the experimental images.

Table 20
Differences between Participants assigned to Different Conditions on Pre-Manipulation Measures in Study 3

	Advertent		Inadvertent		df	F	p	η^2
Main Sample	**Mean**	**SD**	**Mean**	**SD**				
Age	19.61	3.16	19.04	1.97	1, 167	1.94	.17	.01
BMI	22.85	2.64	23.29	3.03	1, 167	0.95	.33	.01
Pre. Weight Satisfaction	5.83	2.37	5.22	2.66	1, 167	2.48	.12	.02
Pre. Self-Esteem	6.60	1.85	6.90	1.45	1, 167	1.29	.26	.01
Restraint (RS-CD)	7.52	3.54	7.63	3.67	1, 167	0.04	.85	.00
Restraint (DIS)	18.25	6.84	19.41	7.11	1, 167	1.17	.28	.01
	Neutral		**IBM**					
Age	19.32	2.96	19.37	2.42	1, 167	0.03	.87	.00
BMI	23.14	2.62	22.97	3.01	1, 167	0.04	.84	.00
Pre. Weight Satisfaction	5.13	2.48	5.95	2.50	1, 167	4.82	.03	.03
Pre. Self-Esteem	6.75	1.67	6.72	1.33	1, 167	0.01	.95	.00
Restraint (RS-CD)	8.08	3.56	7.06	3.57	1, 167	3.74	.06	.02
Restraint (DIS)	19.89	6.78	17.70	7.02	1, 167	4.61	.03	.03

those assigned to the Inadvertent-condition had (M = 23.67, SD = 3.19). Conversely, of those participants assigned to the Neutral-conditions, the average BMI was lower in the Inadvertent-condition (M = 22.90, SD = 2.85), compared to the Advertent-condition (M = 23.34, SD = 2.47). Ideally, any pre-existing differences between participants assigned to the different experimental conditions (i.e., weight satisfaction, DIS scores and BMI) would be controlled for in all analyses. However, it is an assumption that covariates entered into regression models correlate significantly with the outcome measure (Stevens, 1996). None of these three variables correlated significantly with the self-esteem, food intake or LDT-variables (rs < .14) and therefore were not controlled for in such analyses. In comparison, all three variables (weight satisfaction, DIS scores and BMI) correlated significantly with participants' self-reported healthy eating intentions and post-manipulation weight satisfaction (rs > .25). Because the three pre-manipulation variables all correlated significantly (all rs > .27), only one of these variables was controlled for in either analyses to avoid problems of collinearity. Obviously, pre-manipulation weight satisfaction was the most appropriate covariate for the analyses with post-manipulation weight satisfaction as the dependent variable. Furthermore, to be consistent with the covariates utilised in my previous studies (i.e., age and/or BMI), BMI was chosen as the most appropriate covariate for the dependent variable healthy eating intentions.

As in Study 2, participants needed to rate their English language fluency over 7/10 to be included in the LDT analyses. Consequently, the LDT analyses contained 166 of the 171 participants in the sample.

Also similar to Study 2, a subsample of dieters (n = 63) answered four additional questions. Of the participants randomly assigned to the Advertent-Attention-condition, 36 indicated that they were currently dieting. In comparison, 27 participants who were assigned to the Inadvertent-Attention-condition were self-reported dieters. Within the Advertent-Attention-condition, the Neutral-condition contained 17 dieters and the IBM-condition contained 19

Table 21
Differences between Dieters assigned to Different Conditions on Pre-Manipulation Measures in Study 3

	Advertent		Inadvertent		df	F	p	η^2
Subsample dieters	**Mean**	**SD**	**Mean**	**SD**				
Age	19.50	3.63	18.81	1.44	1, 59	0.84	.36	.01
BMI	23.96	2.61	23.66	3.11	1, 59	0.03	.87	.00
Pre. Weight Satisfaction	4.75	1.99	3.59	2.14	1, 59	3.57	.06	.06
Pre. Self-Esteem	6.75	1.76	6.63	1.74	1, 59	0.03	.87	.00
Restraint (RS-CD)	9.39	3.86	9.48	3.61	1, 59	0.40	.84	.00
Restraint (DIS)	21.28	7.62	24.11	6.38	1, 59	1.61	.21	.03
	Control		**IBM**					
Age	19.50	3.69	18.86	1.55	1, 59	0.65	.42	.01
BMI	23.70	2.65	24.00	2.70	1, 59	0.43	.52	.01
Pre. Weight Satisfaction	4.75	1.99	3.59	2.14	1, 59	1.28	.26	.02
Pre. Self-esteem	6.52	1.74	6.90	1.74	1, 59	0.56	.46	.01
Restraint (RS-CD)	9.15	3.61	9.76	3.92	1, 59	0.44	.51	.01
Restraint (DIS)	22.88	6.80	22.42	7.69	1, 59	0.02	.89	.00

dieters. For previously outlined reasons, numbers were lower in the Inadvertent-condition; the Neutral-condition contained 17 dieters, whereas the IBM-condition only contained 10. These dieters reported a mean age of 19.21 (*SD* = 2.90) and mean BMI of 23.84 (*SD* = 2.66). As in the main sample, random assignment was evaluated with a series of 2 (attention condition variable) x 2 (experimental prime condition variable) ANOVAs (Table 21). Random assignment was successful; there were no statistically significant main or interaction effects for the dependent variables age, BMI, restraint status (DIS and RS-CD), pre-manipulation self-esteem and pre-manipulation weight satisfaction.

Procedure. Because Study 3 was a combination of Studies 1 and 2, Study 3 received low-risk ethical approval from the appropriate committee. In Phase 1, participants completed an online pre-test questionnaire for the study entitled Personality and the Five Human Senses (see Appendix V for consent form). Here, participants completed filler items (e.g., touch, sight), measures of dietary restraint (DIS and RS-CD), pre-manipulation implicit self-esteem and pre-manipulation weight satisfaction[45].

Two-weeks later, participants individually came to the laboratory for the second part of the Five Senses study. As in Study 1, a two-study pre-text was used to minimise demand characteristics. That is, before beginning the Five Senses study (Phase 3 below), participants were given the option to complete an *unrelated* study on Coping Skills and Task Performance (Phase 2 below).

Phase 2. During Phase 2 participants were exposed to the experimental manipulations (experimental prime manipulation and attention manipulation) and completed the LDT. Upon arriving to the laboratory, participants consented (Appendix W) to participate in the Personality and the Five Human Senses study (Phase 3). Next, the experimenter casually mentioned that a friend needed a few extra participants for a 10-minute study. Participants were informed that the

[45] This pre-test questionnaire also included items assessing participants' social comparison orientation, locus of control, and high-calorie food craving/liking (see Chapter 2).

study was investigating Coping Skills and Task Performance (i.e., Phase 2), that participation was optional and that they would receive a $5 NZ café voucher if they completed this additional study.

Participants who consented to complete Phase 2 (99.5%) were provided with a questionnaire booklet. By completing the questionnaire, they consented to participate in this allegedly separate study. The first part of the booklet was identical for all participants; they completed demographic questions and a questionnaire on Coping Styles (i.e., the Brief COPE; Carver, 1997). This COPE scale was a filler scale and was not analysed.

Phase 2 inadvertent-attention-condition. Participants who had been randomly assigned to the inadvertent condition were seated beside (not in front of) what appeared to be an unused computer monitor with a blank screen. As participants sat down to begin the questionnaire, the experimenter began the 2-minute slideshow (experimental manipulation) in an adjacent room. This slideshow either contained the IBM- (e.g., Appendix H) or the Neutral- (e.g., Appendix S) images. So that it was not obvious that the experimenter had purposely gone next door to initiate the slideshow, the slideshow began with a blank screen (30 s). Instead of explicitly drawing participants' attention to the slideshow (e.g., Brown & Dittmar, 2005), the first and fourth images in the slideshow were accompanied by a brief and unexplained beep[46]. The seven slides played automatically while participants completed the demographic questions and the COPE scale. After completing the COPE scale, participants began the LDT (Appendix U). The LDT was presented as the measure of task performance. Finally, participants were reimbursed for this study ($5 café voucher), and told that it was time to begin the main study on Personality and the Five Human Senses (i.e., Phase 3).

Phase 2 advertent-attention-condition. For participants assigned to the Advertent-Attention-condition, Phase 2 was similar to the methodology used in Study 2. Participants were

[46] If participants mentioned the images to the investigator (n = 3), she absently replied: "oh, that sometimes starts up randomly, I think that it must be for another study…it generally seems to stop by itself, don't worry too much about it, just continue with your booklet".

told that this first study involved two tasks to assess task performance: a memory recall test and a computer task (the LDT). After completing the demographics and COPE scale in the questionnaire booklet, participants read the instructions for the memory test (see tests in Appendices K & T) and viewed either the IBM- or Neutral-slideshow. After participants had completed the associated memory test, they completed the LDT. Participants were then informed that this study had ended. The experimenter gave participants their $5 café voucher and told them that they would now begin the main study on Personality and the Five Human Senses (i.e., Phase 3).

Phase 3. Similar to Seddon and Berry's (1996) methodology, at the start of Phase 3 participants were made to believe that they were randomly assigned to one of the sensory conditions (e.g., sight, taste etcetera) for the study on the Five Human Senses. Participants were instructed to pull one piece of paper out of a hat containing five pieces of paper, one piece for each of the human senses. In reality, all pieces of paper assigned participants to the Taste-condition. Participants then received a questionnaire booklet on "Taste" and were instructed to complete the first page of questions (hunger, post-manipulation self-esteem and post-manipulation weight satisfaction) while the experimenter set up the taste test on a separate desk[47]. The experimenter left the room while participants completed the 10-minute taste test in a separate booklet (Appendix X). After 10-minutes, the experimenter returned to the room, cleared the food and taste-test booklet and asked participants to complete the remainder of their questionnaires. The remainder of the questionnaire contained filler items[48] and assessed participants' healthy eating intentions. Once participants had completed the questionnaire, the

[47] In Study 1, it was speculated that the taste-test results differed from previous research because of either: (a) the similarly between the comparison conditions (IBM- and Control-images), or (b) the time interval between the manipulation and taste test. Based upon Study 2's results, it seemed more likely that Study 1's taste test results were limited by the similar prime conditions, rather than the time interval. Therefore, I did not believe that the time interval (caused by the LDT) between the experimental manipulation and the taste test would be problematic in Study 3.

[48] As outlined in Chapter 2, participants also completed measures of their avoidance/approach sensitivities, thin-ideal internalisation, dispositional self-control, perceived self-regulatory success and self-reported healthy and unhealthy food intake.

experimenter recorded their weight and height, asked participants to rate (0-10) how much attention they paid to the experimental prime images, debriefed them (Appendix Y) and answered any questions.

Measures. Participants completed self-report measures of their dietary restraint status, weight satisfaction, implicit self-esteem, hunger and healthy eating intentions. Self-reported dieters completed additional questions about their diet goal. The LDT was used to measure participants' avoidance tendencies. At the end of the study, the experimenter measured participants' height and weight and recorded the participants' attention to the prime images.

Dietary restraint status. Participants completed both the DIS (present study Cronbach's $\alpha = .88$) and the RS-CD (present study Cronbach's $\alpha = .81$) online.

Body mass index. As in Studies 1 and 2, the experimenter weighed and measured each participant's height at the end of the study. These measurements were used to calculate participants' BMI (kg/m^2).

Weight satisfaction and implicit self-esteem. Participants rated their weight satisfaction and implicit self-esteem on the same scales used in Study 2. Both measures were completed online during Phase 1 and again before the taste test in Phase 3. Higher scores indicate greater satisfaction and self-esteem.

The lexical decision task (LDT). The joystick LDT (e.g., Chen & Bargh, 1999; Fishbach & Shah, 2006) was the same task that was used in Study 2 and was completed in Phase 2 of Study 3. As mentioned, unlike in Study 2, in Study 3 participants only completed the stimulus avoidance, rather than approach, LDT. Three variables were computed—reaction time to avoid diet words, sweet food words and savoury food words.

Hunger. At the beginning of Phase 3, participants rated their hunger on a visual analogue scale (*not hungry at all – extremely hungry*) before the taste test (e.g., Wardle & Beales, 1987).

Food intake. Participants' food intake was measured with a taste test (Appendix X). They thought that this test was being used to explore the relationship between their personality and taste perceptions. Participants sat down to a large glass of water, a questionnaire booklet and four large bowls of unhealthy food (salted pretzel bows, savoury crackers, chocolate/peanut M&Ms and bite-sized cookies). The order of the bowls was counterbalanced between participants. As in Study 1, participants were required to rate (1 = *certainly not*, to 7 = *certainly yes*) each food on 13 dimensions (e.g., this food is sickly). After participants completed rating all bowls of food, they ranked each food from most to least favourite and noted which food they most often consumed outside of the laboratory. These additional questions were included to encourage food intake.

Participants completed the 10-minute taste test alone in the laboratory. Before leaving the room, the experimenter ensured that participants understood to taste and rate each bowl of food sequentially and that they could eat as much as was necessary to provide accurate ratings[49]. Each bowl was weighed with a professional balance before and after each participant's taste test. Because each of the four foods was different in weight, the grams consumed from each bowl were standardised prior to analyses (e.g., Evers, Stok, & de Ridder, 2010). These standardised data were used in all analyses (e.g., HMR and simple slopes), but for ease of interpretation descriptive statistics were calculated, and figures were constructed with the raw data. As mentioned previously, IBM-exposure can have significantly different effects upon participants' sweet and savoury intake (e.g., Monro & Huon, 2006), and participants respond significantly differently to sweet and savoury foods when they are under stress (Dube et al., 2005). Therefore, participants' cookie and M&M intake were combined to form a sweet intake variable, and participants' pretzel and cracker intake were combined to form a savoury intake variable.

[49] In Study 1, participants were told that all food was disposed of after each participant's taste test. In hindsight, this may have been unrealistic and aroused suspicion about the taste tests' purpose. Therefore, the instructions given to participants in Study 3 were kept simple and realistic.

Healthy eating intentions. Two items were used to assess participants' healthy eating intentions (Kroese, Evers, & de Ridder, 2009). On a 7-point scale, participants rated (*not at all – very much*) the extent they were planning to eat more healthily and the extent they intend to eat more healthily. Kroese et al. (2009) obtained a Cronbach's α of .86 in their original study. Similarly, Cronbach's α in the present study was .88.

Dieting goal. As in Study 2, for exploratory purposes, participants were asked if they were currently dieting to lose weight. If they were dieting, they completed the same four questions that the dieters in Study 2 completed. These questions assessed the dieters' weight-goal (kg), weight-goal effort, and perceived difficulty to achieve their goal and avoid high-calorie foods.

Attention. Before the debriefing, the experimenter asked participants to rate (0 = *no attention*, 10 = *high attention*) how much attention they paid to the slideshow of images.

Analyses. As in previous studies, descriptive and correlational statistics were the first analyses performed. Next, after controlling for the influence of any covariates in Step 1, HMR analyses (using SPSS GLM) were used to probe for the presence or absence of statistically significant main effects (experimental prime condition variable, attention condition variable, restraint status variable), 2-way interaction effects (prime variable x restraint variable, attention variable x restraint variable, prime variable x attention variable), and the hypothesised 3-way interaction effect (prime variable x attention variable x restraint variable) on all eight dependent measures—weight satisfaction, implicit self-esteem, LDT variables (log-transformed), food intake (standardised) and healthy eating intentions[50]. As in the previous experiments, sufficient power (90%) to detect a medium sized 3-way interaction effect with alpha set at .05 was achieved (Faul et al., 2009). Two sets of these eight regression models were analysed, one with participants' RS-CD scores and one with participants' DIS scores. Once again, these moderators

[50]None of the dependent variables in Study 3 were normally distributed (all Kolmogorov-Smirnov tests $p <$ .05). Because of the large sample size, these violations were not considered problematic (Gravetter & Wallnau, 2000).

(DIS and RS-CD) were kept as continuous variables within all HMR analyses and simple slopes (Sibley, 2008) were constructed to further investigate any statistically significant interaction effects.

As in Study 2, for exploratory purposes, I performed correlational and HMR analyses on the dieting subsample's data. In addition to the eight dependent variables in the main sample, the four extra dieting variables were explored[51]. Because of the smaller sample size, only main effects and 2-way (not 3-way) interaction effects were investigated.

Results

Manipulation check. An independent samples t-test suggested that the attention manipulation was successful, $t(169) = 25.97$, $p < .001$, $\eta^2 = .80$. Participants in the Advertent-condition rated their attention to the prime images significantly higher ($M = 7.91$, $SD = 1.23$, range 4-10), than participants in the Inadvertent-condition rated their attention ($M = 2.83$, $SD = 1.33$, range 1-6.5).

Preliminary analyses. The means, standard deviations and correlations between the variables are presented in Table 22. Here, I only discuss significant correlations that are not discussed elsewhere. It is necessary to reiterate that all correlations (in the main and dieting subsample) with the LDT and food-intake variables have been performed with the log-transformed/standardised data, but the descriptive statistics were calculated with the non-transformed/un-standardised data.

Participants' age did not correlate significantly with the dependent variables. However, there was a marginally significant positive correlation between age and participants' pre-manipulation implicit self-esteem. In terms of participants' BMI, this variable correlated positively and significantly with both restraint scores (RS-CD and DIS). As mentioned in the Participant description, participants' BMI also correlated significantly with their pre- and post-

[51] As in the main sample, these dependent variables were not normally distributed, but because the sample size exceeded 30 this was not problematic (Gravetter & Wallnau, 2000).

Table 22
Correlation Matrix and Descriptive Statistics for all Study 3 Variables

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Restraint (RS-CD)														
2	Restraint (DIS)	.66***													
3	Age	-.03	-.02												
4	BMI	.27***	.27***	.02											
5	Pre. Weight Sat.	-.62***	-.50***	.07	-.55***										
6	Post. Weight Sat.	-.55***	-.49***	.05	-.49***	.83***									
7	Pre. Self-Esteem	-.03	.02	.15†	.08	.11	.21**								
8	Post. Self-Esteem	-.05	.04	.13	.06	.12	.25***	.87***							
9	Av. Sav. Food words	.08	.10	.08	-.10	.06	.01	.03	-.00						
10	Av. Sweet Food words	.04	.02	-.05	-.11	-.02	-.05	-.15†	-.09	.09					
11	Av. Diet words	.02	-.06	.07	-.10	.08	.01	-.01	-.02	.06	.24***				
12	Sweet Food Intake	.16*	.07	.10	.06	-.17*	-.09	.11	.11	-.15†	-.08	-.06			
13	Savoury Food Intake	.09	.14†	.10	.07	-.20*	-.11	.04	.04	-.07	-.07	.09	.25**		
14	Healthy Eating Intent.	.46***	.36***	.01	.25***	-.31***	-.28***	-.01	.03	.01	-.05	.00	-.02	.04	
	M	7.57	18.78	19.35	22.94	5.55	5.91	6.74	6.97	690.47	635.66	673.22	0.031	0.013	5.03
	SD	3.59	6.97	2.69	2.83	2.52	2.30	1.68	1.71	75.06	53.35	45.24	0.019	0.013	1.29

Note. For all three LDT analyses, participants' neutral word reaction time has been controlled for. Similarly, participants' hunger rating has been controlled for in the savoury food intake analyses. All *r*-values < .001 have been rounded to .00.
†$p < .10$, *$p < .05$, **$p < .01$, ***$p < .001$.

manipulation weight satisfaction (negative correlations) and healthy eating intentions (positive correlation). Consequently, participants' BMI was entered as a covariate in the analyses with healthy eating intentions as the dependent variable. However, to avoid collinearity between participants' BMI and pre-manipulation weight satisfaction (r = -.55), only pre-manipulation weight satisfaction (not BMI) was controlled for in the analyses with post-manipulation weight satisfaction as the dependent variable. In addition, hunger was entered as a covariate in the analyses with participants' savoury food intake as the dependent variable (r = .30), but not in the analyses with the sweet food intake dependent variable (r = .11). Last, neutral word reaction time was controlled for in all LDT analyses (rs > .64) and (where applicable) pre-manipulation measures in all post-manipulation analyses.

As would be expected, participants' pre- and post-manipulation weight satisfaction and pre- and post-manipulation self-esteem correlated highly and positively. Likewise, participants' sweet food intake during the taste test correlated positively with their savoury food intake. In terms of the LDT-variables, after controlling for participants' response times away from neutral words, participants' avoidance of diet words and sweet food words correlated positively.

Similar to the cross-sectional analyses presented in Chapter 2[52], participants' scores on the restraint scales correlated positively with each other. Additionally, both restraint scores correlated negatively with participants' pre-manipulation weight satisfaction. Furthermore, participants' post-manipulation weight satisfaction correlated positively with their implicit self-esteem (pre- and post-manipulation). There was also a marginally significantly negative correlation between participants' pre-manipulation self-esteem and their avoidance of sweet food words in the LDT.

Next, the amount of food (sweet and savoury) participants consumed during the taste test correlated negatively with their pre-manipulation weight satisfaction. There was also a

[52] As in previous chapters, the correlations between participants' restraint scores and the variables in Study 3 were similar, but not identical to the correlations obtained in the cross-sectional analyses (Chapter 2). This is because suspicious participants and elder participant's (etcetera) were excluded for the experimental, but not for the cross-sectional analyses.

marginally significant negative correlation between their sweet food intake and their avoidance of savoury food words during the LDT. Last, there were two significant negative correlations between participants' weight satisfaction (pre- and post-manipulation) and their self-reported healthy eating intentions after the taste test.

Main analyses. Two groups (RS-CD and DIS) of eight HMR analyses were conducted to test for any statistically significant main and interaction effects. The data set for Study 3 did not contain any outliers (datum points greater than three standardised residuals from the regression line with a Cooks Distance greater than one; Newton & Rudestam, 1999; Tabachnick & Fidell, 2001). All other regression assumptions are discussed where appropriate.

The descriptive statistics for the dependent variables in Study 3 are in Table 23 and Tables 24 and 25 contain all HMR analyses. As mentioned, potential covariates (e.g., hunger or pre-manipulation measures) were entered in Step 1 of the following HMR analyses, followed by all main effects in Step 2, and 2-way interaction effects in Step 3. Statistics in Tables 24 and 25 are from Step 4 (hypothesised 3-way interaction effect between prime condition variable, attention condition variable and the restraint variable). However, to facilitate interpretation of all effects, each R^2 change value is relevant for each individual step. In terms of the homogeneity of regression slopes, none of the covariates significantly interacted with the manipulation conditions (covariate x prime condition variable; covariate x attention condition variable; covariate x prime condition variable x attention condition variable) to predict the dependent variables (*p*s > .08).

Manipulation conditions: Main and interaction effects. This section contains detail about the main and interaction effects for the attention and experimental prime manipulation conditions (Steps 2 and 3). There was no multicollinearity between the two manipulation condition variables that were combined to form the manipulation condition interaction variable (prime condition variable and attention condition variable) and the interaction variable (VIFs < 2.92, tolerances > .34).

Table 23
Descriptive Statistics for the Dependent Variables in Study 3

		Inadvertent		Advertent		Total	
		Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**
Weight Satisfaction	**IBM**	6.24	2.75	5.91	2.48	6.07	1.81
covariate: pre. weight sat.	**Neutral**	5.75	2.75	5.77	2.51	5.76	1.84
	Total	6.00	1.96	5.84	1.70		
Implicit Self-Esteem	**IBM**	7.08	1.83	6.82	1.57	6.95	1.20
covariate: pre. self-esteem	**Neutral**	7.01	1.82	7.02	1.70	7.01	1.22
	Total	7.04	1.31	6.92	1.18		
Av. Sav. Food Words	**IBM**	667.36	155.74	693.53	141.75	680.44	105.27
covariate: neutral word react.	**Neutral**	693.88	153.91	689.54	146.98	691.71	104.88
	Total	680.52	109.45	691.54	101.87		
Av. Sweet Food Words	**IBM**	641.31	111.41	638.27	101.48	639.79	75.32
covariate: neutral word react.	**Neutral**	620.48	110.11	637.54	105.14	629.01	75.98
	Total	630.89	78.33	637.61	72.84		
Av. Diet Words	**IBM**	676.29	94.15	679.10	85.65	677.70	63.55
covariate: neutral word react.	**Neutral**	679.24	92.98	655.60	88.79	667.42	64.21
	Total	677.77	66.17	667.35	61.59		
Sweet Food Intake	**IBM**	0.030	0.039	0.030	0.039	0.031	0.026
	Neutral	0.034	0.039	0.027	0.039	0.030	0.026
	Total	0.032	0.026	0.029	0.026		
Savoury Food Ontake	**IBM**	0.011	0.013	0.014	0.013	0.012	0.013
covariate: hunger	**Neutral**	0.016	0.013	0.011	0.013	0.013	0.013
	Total	0.013	0.013	0.012	0.013		
Healthy Eat. Intentions	**IBM**	5.15	2.75	4.92	2.35	5.03	1.83
covariate: BMI	**Neutral**	5.06	2.62	5.02	2.48	5.04	0.14
	Total	5.10	1.83	4.97	1.70		

Note. Where covariates have been controlled for, the descriptive statistics have been adjusted for the covariates' influence.

Table 24

Interactive Effects of the Prime Condition Variable, Attention Condition Variable and Participants' Restraint Status (RS-CD) on the Dependent Variables in Study 3

		R^2 change	df	F	β	b	p
Weight Satisfaction							
1	Pre. Weight Sat.	.69***	1, 160	198.92	0.79	0.72	.00
2	Exp. Prime condition	.01	1, 160	0.28	0.03	0.14	.60
	Attention condition		1, 160	0.00	0.00	0.01	.97
	RS-CD		1, 160	0.05	0.02	0.01	.83
3	Prime x RS-CD	.00	1, 160	0.57	-0.06	-0.05	.45
	Attention x RS-CD		1, 160	1.07	-0.09	-0.07	.30
	Prime x Attention		1, 160	0.56	0.06	0.30	.46
4	Prime x Attent. x RS-CD	.00	1, 160	0.78	0.07	0.08	.38
Avoid Savoury Food Words							
1	Neutral Word React.	.41***	1, 157	110.73	0.65	0.91	.00
2	Exp. Prime condition	.01	1, 157	0.12	-0.04	-0.01	.73
	Attention condition		1, 157	0.07	0.02	0.00	.79
	RS-CD		1, 157	0.49	0.09	0.00	.49
3	Prime x RS-CD	.00	1, 157	0.04	-0.03	-0.00	.85
	Attention x RS-CD		1, 157	0.01	-0.01	0.00	.92
	Prime x Attention		1, 157	0.56	-0.08	-0.01	.46
4	Prime x Attent. x RS-CD	.00	1, 157	0.04	-0.02	-0.00	.84
Avoid Diet Words							
1	Neutral Word React.	.73***	1, 157	467.08	0.87	0.97	.00
2	Exp. Prime condition	.01	1, 157	6.17	0.14	0.01	.01
	Attention condition		1, 157	5.67	0.14	0.01	.02
	RS-CD		1, 157	0.38	-0.05	-0.00	.54
3	Prime x RS-CD	.01	1, 157	0.16	0.03	0.00	.69
	Attention x RS-CD		1, 157	2.52	0.12	0.00	.12
	Prime x Attention		1, 157	3.32	-0.12	-0.01	.07
4	Prime x Attent. x RS-CD	.00	1, 157	1.78	-0.10	-0.00	.18
Savoury Food Intake							
1	Hunger	.09***	1, 151	15.41	0.30	0.12	.00
2	Exp. Prime condition	.01	1, 151	2.44	0.17	0.48	.12
	Attention condition		1, 151	5.84	0.27	0.74	.02
	RS-CD		1, 151	0.91	0.16	0.05	.34
3	Prime x RS-CD	.05*	1, 151	0.01	0.02	0.01	.90
	Attention x RS-CD		1, 151	0.32	-0.09	-0.04	.58
	Prime x Attention		1, 151	7.82	-0.36	-1.19	.01
4	Prime x Attent. x RS-CD	.00	1, 151	0.38	-0.09	-0.06	.54
Implicit Self-Esteem							
1	Pre. Self-Esteem	.76***	1, 160	504.50	0.87	0.88	.00
2	Exp. Prime condition	.00	1, 160	1.50	-0.07	-0.22	.22
	Attention condition		1, 160	0.00	-0.01	-0.02	.96
	RS-CD		1, 160	1.90	-0.11	-0.04	.17
3	Prime x RS-CD	.01	1, 160	0.25	0.04	0.02	.62
	Attention x RS-CD		1, 160	0.62	0.06	0.03	.43
	Prime x Attention		1, 160	1.31	0.08	0.32	.25
4	Prime x Attent. x RS-CD	.00	1, 160	0.12	0.03	0.02	.73
Avoid Sweet Food Words							
1	Neutral Word React.	.63***	1, 157	281.50	0.79	0.90	.00
2	Exp. Prime condition	.00	1, 157	0.08	-0.02	-0.00	.78
	Attention condition		1, 157	2.70	-0.11	-0.01	.10
	RS-CD		1, 157	0.36	-0.06	0.00	.55
3	Prime x RS-CD	.03*	1, 157	0.54	-0.07	-0.00	.46
	Attention x RS-CD		1, 157	2.13	0.13	0.00	.15
	Prime x Attention		1, 157	2.80	0.13	0.02	.10
4	Prime x Attent. x RS-CD	.00	1, 157	1.64	0.11	0.00	.20
Sweet Food Intake							
1	Exp. Prime condition	.03	1, 150	2.72	0.18	0.54	.10
	Attention condition		1, 150	1.43	0.13	0.40	.23
	RS-CD		1, 150	0.09	0.05	0.02	.77
2	Prime x RS-CD	.02	1, 150	1.56	0.20	0.09	.21
	Attention x RS-CD		1, 150	1.30	0.18	0.09	.26
	Prime x Attention		1, 150	2.80	-0.22	-0.80	.10
3	Prime x Attent. x RS-CD	.04*	1, 150	6.87	-0.38	-0.28	.01
Healthy Eating Intentions							
1	BMI	.06**	1, 162	2.50	0.11	0.05	.12
2	Exp. Prime condition	.17**	1, 162	0.08	-0.03	-0.07	.78
	Attention condition		1, 162	0.01	-0.01	-0.03	.92
	RS-CD		1, 162	26.58	0.73	0.21	.00
3	Prime x RS-CD	.02	1, 162	3.17	-0.24	-0.10	.08
	Attention x RS-CD		1, 162	5.76	-0.32	-0.14	.02
	Prime x Attention		1, 162	1.08	0.12	0.37	.30
4	Prime x Attent. x RS-CD	.01	1, 162	3.02	0.21	0.14	.08

Note. Apart from the R^2 change values, all other values are taken from the last step of each analysis. Any values < 0.001 have been rounded to 0.00. The degrees of freedom differ between models because of the number of covariates or missing data. *$p < .05$, **$p < .01$, ***$p < .001$.

Inspection of the R^2 change values (Tables 24 and 25) suggests that, over and above any covariates, entering all main effects into the models did not account for an additional amount of significant variance in the majority of the dependent variables. Although Step 2 in the 'eating intentions' regression model accounted for a significant 10-17% of the variance, inspection of the Step 2 statistics (not in Tables) shows that participants' restraint scores (discussed below), rather than the manipulation condition variables accounted for this significant effect.

Entering the 2-way interaction effects (see Table 23 for descriptive statistics) into Step 3 of the regression models accounted for a statistically significant amount of variance in participants' reaction time to avoid sweet food words in the LDT (Table 24 only) and in their savoury food intake during the taste test. Inspection of Step 3 statistics (not displayed in the Tables) suggested that it was the interaction between participants' RS-CD scores and the attention condition variable that contributed toward the variance accounted for in the LDT-avoid sweet food words model (this is addressed in the following sections). However, relevant here, in Step 3 of the savoury food intake model, the attention condition variable interacted with the experimental prime condition variable (p = .01). This effect was not qualified by a significant 3-way interaction effect. Therefore, this 2-way interaction effect is explored below.

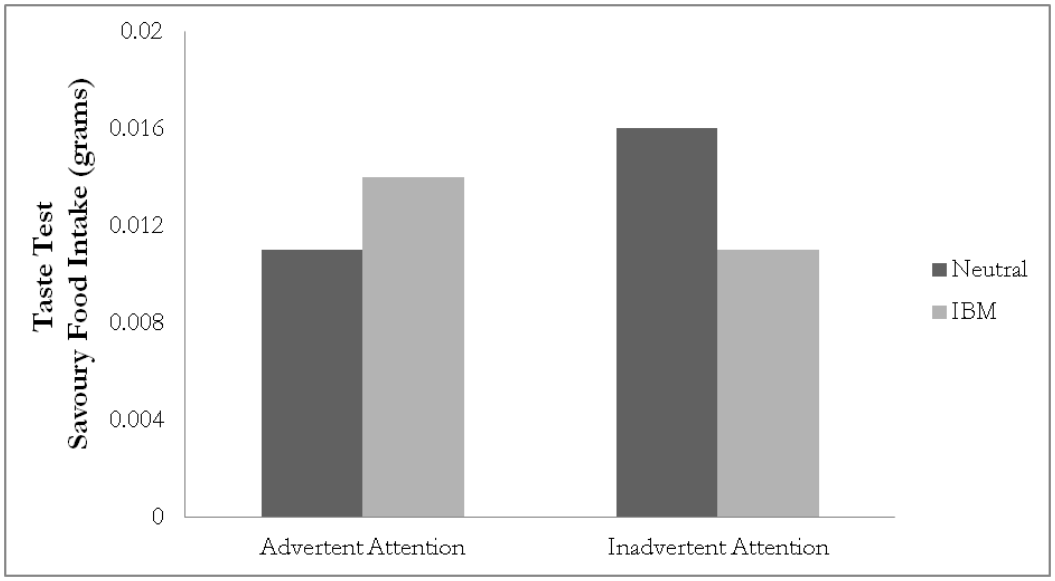

Figure 9. Interactive effect of the experimental prime condition variable and attention condition variable on participants' savoury food intake during the taste test

The pattern displayed in Figure 9 suggests that, after controlling for participants' hunger levels, the amount of savoury food participants ate in the Inadvertent-Attention-condition depended upon the slideshow that they had been exposed to, $F(1,74) = 5.78$, $p = .02$, $\eta^2 = .07$. Participants inadvertently exposed to the IBM-slideshow ate significantly less than those exposed to the Neutral-slideshow (see Table 23). In contrast, seeing different experimental prime images did not significantly influence how much food participants in the Advertent-condition ate, $F(1, 80) = 1.87$, $p = .17$, $\eta^2 = .02$. Participants ate similar amounts in the IBM- and Neutral-conditions.

Main and interaction effects: Restraint Scale-concern for dieting subscale. There were problems of multicollinearity between the predictor variables within the interaction variables and the interaction variables (prime condition variable x restraint variable; attention condition variable x restraint variable; prime condition variable x attention condition variable x restraint variable) for all dependent measures. Mean-centering amended all problems (VIFs < 3.40, tolerances > .30). None of the regression assumptions were violated (e.g., normally distributed residuals, linearity and homoscedasticity). As in previous studies, the main effect βs for participants' RS-CD scores that are presented in the text below are from Step 2 (or Step 1 for the sweet food intake model) and therefore differ slightly from the final step βs presented in the Table 24.

Weight satisfaction and implicit self-esteem. After controlling for pre-manipulation measures, there was not a significant relationship between participants' restraint scores and their post-manipulation weight satisfaction or self-esteem (βs < 0.06). Similarly, adding the 2-way (Step 3 R^2 changes = < .02, *p*s > .30) and 3-way interaction effects (Step 4 R^2 changes < .01, *p*s > .38) to these models did not account for an additional amount of significant variance in either dependent variable.

LDT variables. There were no significant relationships between participants' RS-CD scores and any of the three (avoidance of diet words, sweet food words and savoury food words)

LDT variables (βs < 0.09). Second, the 2-way interactions in Step 3 (R^2 changes < .02, *p*s > .19) or the 3-way interactions in Step 4 (R^2 changes < .001, *p*s > 18) did not explain a significant amount of variance in participants' avoidance of diet words and savoury food words. However, as mentioned previously, entering the 2-way interactions into Step 3 of the model predicting participants' avoidance of sweet food words accounted for a statistically significant additional 3% (p = .01) of the variance. Inspection of the relevant Step 3 statistics showed that this effect was attributable to a significant interaction between the attention condition variable and participants' restraint status (p = .001). Because this 2-way interaction effect was not qualified by a significant 3-way interaction, (Step 4 R^2 change < .001, p = .20) the interaction between the restraint variable and the attention variable was explored.

Figure 10. Interactive effect of the attention condition variable and participants' dietary restraint status (RS-CD) on LDT response time to push/avoid sweet food words

The pattern displayed in Figure 10 demonstrates that there was a statistically significant positive relationship between participants' restraint score and their response time to avoid sweet food words in the Inadvertent-Attention-condition (β = 0.21, t = 2.41, p = .02). This implies that, compared to those with lower restraint scores, participants with higher restraint scores were

slower to avoid the words. This relationship between restraint and response times was not statistically significant in the Advertent-Attention-condition (β = -0.12, t = -1.45, p = .15).

Food intake. The relationship between participants' restraint scores and sweet food intake during the taste test was marginally significant (β = 0.15, p = .07). Entering the 2-way interaction effects into this model did not account for an additional significant amount of variance in participants' sweet food intake (Step 3 R^2 change = .02, p = .38). However, in Step 4 the 3-way interaction between the experimental prime condition variable, attention condition variable and participants' RS-CD score accounted for an additional 4% of the variance in their sweet food intake (p = .01).

For ease of interpretation this interaction effect is presented in two separate Figures—Figure 11 (advertent attention) and Figure 12 (inadvertent attention). Participants' restraint status did not interact significantly with the experimental prime condition variable in the Advertent-Attention-condition (R^2 change = .02, p = .22). However, simple slope analyses (Figure 11) showed that there was a statistically significant positive relationship between participants' restraint scores and their sweet food intake in the IBM-condition (β = 0.34, t = 2.30, p = .02). This effect was not statistically significant in the Neutral-condition (β = 0.05, t = 0.30, p = .72).

Participants' restraint status interacted significantly with the experimental prime condition variable in the Inadvertent-Attention-condition (R^2 change = .08, p = .02). As can be seen in Figure 12, in the inadvertent Neutral-condition, the relationship between participants' food intake and restraint scores was positive and significant (β = 0.31, t = 2.02, p = .05). The opposite, but nonsignificant, relationship emerged in the inadvertent IBM-condition (β = -0.25, t = -1.46, p = .15).

Participants approached the savoury food differently during the taste test. First, after controlling for their level of hunger, participants' RS-CD scores were not significantly related to their savoury food intake (β = 0.07). Second, as previously mentioned, entering the 2-way interactions into the savoury food intake model in Step 3 contributed a statistically significant

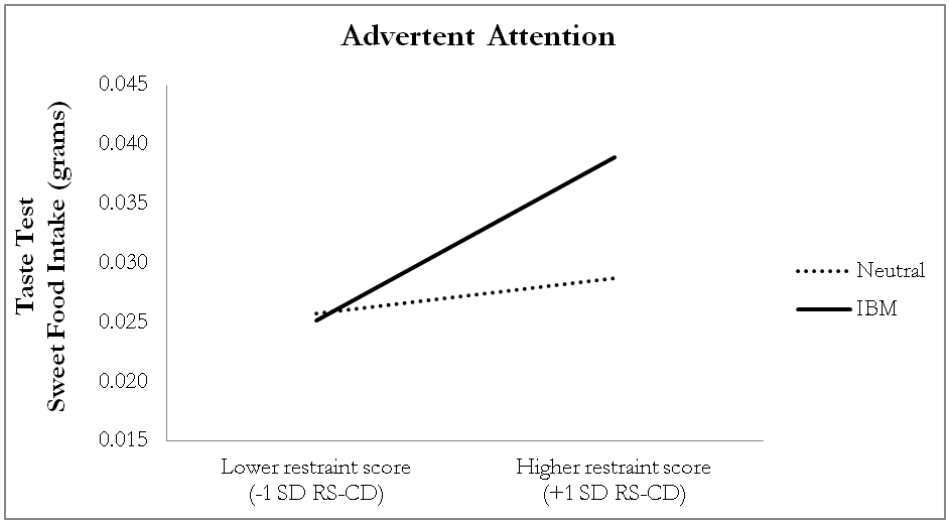

Figure 11. Interactive effect of the experimental prime condition variable and participants' dietary restraint status (RS-CD) on sweet food intake during the taste test in the advertent-attention-condition

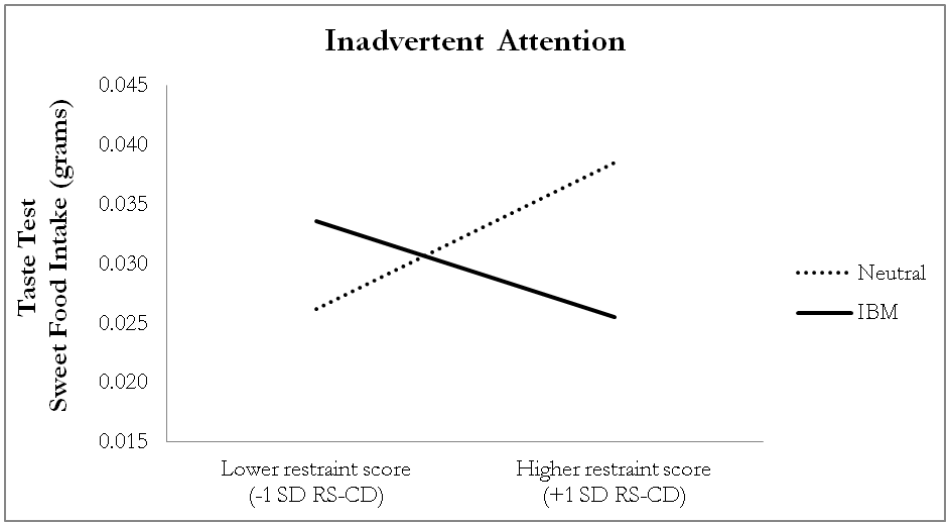

Figure 12. Interactive effect of the experimental prime condition variable and participants' dietary restraint status (RS-CD) on sweet food intake during the taste test in the inadvertent-attention-condition

additional 5% of variance (p = .02). However, this increased variance can be accounted for by the, previously discussed, interaction between the attention condition variable and experimental prime variable (Figure 9). Last, the 3-way interaction effect entered in Step 4 was not significant (Step 4 R^2 change < .01, p = .54).

Healthy eating intentions. There was a statistically significant positive relationship between participants' restraint scores and their self-reported healthy eating intentions (β = 0.43). This main effect was not qualified by statistically significant interaction effects in Step 3 (R^2 change = .02, p = .20) or in Step 4 (R^2 change = .01, p = .08).

Dietary Intent Scale: Main and interaction effects. As above, multicollinearlity was present between the predictor variables in the interaction variables and the interaction variables (prime condition variable x restraint variable; attention condition variable x restraint variable; prime condition variable x attention condition variable x restraint variable) for all dependent measures. Again, mean-centering alleviated this problem (VIFs < 3.47, tolerances > .29). None of the regression assumptions were violated (e.g., normally distributed residuals, linearity and homoscedasticity). HMR analyses are in Table 25.

Weight satisfaction and implicit self-esteem. After controlling for participants' pre-manipulation weight satisfaction, there was a marginally significant negative relationship between participants' restraint status and their post-manipulation weight satisfaction (β = -0.09, p = .08). In comparison, after controlling for participants' pre-manipulation self-esteem, their restraint status was not significantly related to their post-manipulation implicit self-esteem (β = 0.02). Similarly, neither the 2-way (Step 3 R^2 changes < .01, ps > .52), nor 3-way interaction effects (Step 4 R^2 changes < .02, ps > .10) predicted either of these dependent variables[53].

[53] Including suspicious participants (n = 29) meant that the 3-way interaction effect explained a significant 1% (p = .01) of the variance in participants' post-manipulation weight satisfaction. Accordingly, 2-way interaction effects (advertent vs. inadvertent attention) were checked. However, neither the 2-way interaction effect (dietary restraint status x experimental prime condition variable) in the Inadvertent-Attention-condition (R^2 = .01, p = .06), nor the Advertent-Attention-condition (R^2 = .01, p = .10) reached statistical significance.

Table 25

Interactive Effects of the Prime Condition Variable, Attention Condition Variable and Participants' Restraint Status (DIS) on the Dependent Variables in Study 3

		R^2 change	df	F	β	b	p
Weight Satisfaction							
1	Pre. Weight Sat.	.70***	1, 160	236.14	0.77	0.70	.00
2	Exp. Prime condition	.01	1, 160	0.22	0.03	0.13	.64
	Attention condition		1, 160	0.10	0.02	0.09	.75
	DIS		1, 160	0.20	0.04	0.01	.65
3	Prime x DIS	.00	1, 160	1.59	-0.11	-0.05	.21
	Attention x DIS		1, 160	3.61	-0.17	-0.08	.06
	Prime x Attention		1, 160	0.36	0.04	0.24	.55
4	Prime x Attent. x DIS	.01	1, 160	2.70	0.13	0.10	.10
Avoid Savoury Food Words							
1	Neutral Word React.	.41***	1, 157	106.64	0.64	0.90	.00
2	Exp. Prime condition	.01	1, 157	0.13	-0.03	-0.00	.72
	Attention condition		1, 157	0.04	0.02	0.00	.84
	DIS		1, 157	0.98	0.14	0.00	.33
3	Prime x DIS	.00	1, 157	0.39	-0.08	-0.00	.54
	Attention x DIS		1, 157	0.11	-0.04	-0.00	.74
	Prime x Attention		1, 157	0.43	-0.07	-0.01	.51
4	Prime x Attent. x DIS	.00	1, 157	0.13	0.04	0.00	.72
Avoid Diet Words							
1	Neutral Word React.	.73***	1, 157	455.10	0.87	0.97	.00
2	Exp. Prime condition	.01	1, 157	5.80	0.13	0.01	.02
	Attention condition		1, 157	6.30	0.15	0.01	.01
	DIS		1, 157	1.09	-0.09	-0.00	.30
3	Prime x DIS	.01	1, 157	0.19	0.04	0.00	.66
	Attention x DIS		1, 157	0.95	0.08	0.00	.33
	Prime x Attention		1, 157	3.55	-0.13	-0.02	.06
4	Prime x Attent. x DIS	.00	1, 157	0.45	-0.05	-0.00	.51
Savoury Food Intake							
1	Hunger	.09***	1, 151	15.41	0.30	0.12	.00
2	Exp. Prime condition	.02	1, 151	2.40	0.16	0.45	.12
	Attention condition		1, 151	6.34	0.27	0.77	.01
	DIS		1, 151	1.24	0.19	0.04	.27
3	Prime x DIS	.06*	1, 151	0.12	0.06	0.02	.73
	Attention x DIS		1, 151	1.59	-0.20	-0.06	.21
	Prime x Attention		1, 151	8.00	-0.37	-1.21	.01
4	Prime x Attent. x DIS	.00	1, 151	0.00	0.01	0.01	.94
Implicit Self-Esteem							
1	Pre. Self-Esteem	.76***	1, 160	484.66	0.86	0.88	.00
2	Exp. Prime condition	.01	1, 160	1.02	-0.05	-0.18	.31
	Attention condition		1, 160	0.01	-0.01	-0.02	.91
	DIS		1, 160	0.96	-0.08	-0.02	.33
3	Prime x DIS	.00	1, 160	1.75	0.11	0.04	.19
	Attention x DIS		1, 160	0.89	0.08	0.03	.35
	Prime x Attention		1, 160	1.03	0.07	0.27	.31
4	Prime x Attent. x DIS	.01	1, 160	0.68	-0.06	-0.03	.41
Avoid Sweet Food Words							
1	Neutral Word React.	.63***	1, 157	260.44	0.78	0.89	.00
2	Exp. Prime condition	.00	1, 157	0.05	-0.01	-0.00	.83
	Attention condition		1, 157	2.52	-0.11	-0.01	.11
	DIS		1, 157	0.31	-0.06	0.00	.58
3	Prime x DIS	.01	1, 157	0.00	-0.01	-0.00	.95
	Attention x DIS		1, 157	1.14	0.11	0.00	.29
	Prime x Attention		1, 157	2.19	0.12	0.01	.14
4	Prime x Attent. x DIS	.00	1, 157	0.23	0.04	0.00	.63
Sweet Food Intake							
1	Exp. Prime condition	.01	1, 150	2.38	0.17	0.52	.13
	Attention condition		1, 150	1.72	0.15	0.46	.19
	DIS		1, 150	0.45	-0.13	-0.03	.51
2	Prime x DIS	.02	1, 150	1.64	0.22	0.06	.20
	Attention x DIS		1, 150	0.95	0.17	0.05	.33
	Prime x Attention		1, 150	2.58	-0.22	-0.79	.11
3	Prime x Attent. x DIS	.02	1, 150	2.84	-0.26	-0.12	.09
Healthy Eating Intentions							
1	BMI	.06***	1, 162	3.70	0.15	0.07	.06
2	Exp. Prime condition	.10***	1, 162	0.06	-0.02	-0.06	.81
	Attention condition		1, 162	0.12	-0.04	-0.09	.73
	DIS		1, 162	10.56	0.52	0.10	.00
3	Prime x DIS	.03	1, 162	0.30	-0.08	-0.02	.58
	Attention x DIS		1, 162	1.53	-0.18	-0.05	.22
	Prime x Attention		1, 162	0.73	0.11	0.33	.39
4	Prime x Attent. x DIS	.00	1, 162	0.00	-0.01	-0.00	.95

Note. Apart from the R^2 change values, all other values are taken from the last step of each analyses. Any values < 0.001 have been rounded to 0.00. The degrees of freedom differ between models because of the number of covariates or missing data. *$p < .05$, **$p < .01$, ***$p < .001$.

LDT variables. There were no significant relationships between participants' restraint scores and their reaction times toward—avoidance of—diet words or food words during the LDT (βs < 0.02). Likewise, neither the 2-way (Step 3 R^2 changes < .02, *p*s > .10), nor 3-way interactions (Step 4 R^2 changes < .01, *p*s > .50) accounted for an additional amount of variance in these reaction times.

Food intake. Participants' DIS scores were not significantly related to their sweet food intake during the taste test (β = 0.06). Adding the 2-way interactions to the sweet food intake regression model in Step 3 did not account for a significant amount of variance (R^2 change = .02, p = .49). Likewise, adding the 3-way interaction in Step 4 only explained a marginally statistically significant additional 2% of the variance (p = .09)[54].

Similar to participants' sweet food intake, participants' DIS scores were not significantly related to their savoury food intake (β = 0.12). However, entering the 2-way interactions into the savoury food intake model in Step 3 accounted for 6% of this variance (p = .01). Inspection of the relevant statistics in Step 3 showed that the, previously outlined, interaction between the attention and experimental prime condition variables accounted for this effect (Figure 9). This 2-way interaction was not qualified by a statistically significant 3-way interaction between participants' restraint status, the attention condition variable and the experimental prime condition variable (Step 4 R^2 change < .01, p = .94).

Healthy eating intentions. Participants' restraint scores were positively and significantly related to their healthy eating intentions (β = 0.33). This effect was not qualified by significant 2-way (Step 3 R^2 change = .03, p = .15) or 3-way interaction effects (Step 4 R^2 change < .01, p = .95).

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[54] For later discussion purposes, this marginal significant 3-way interaction was broken down into two 2-way interactions (advertent vs. inadvertent). Neither the 2-way interaction effect (R^2 change = .02, p = .19) nor the simple slopes (*p*s > .24) were statistically significant in the Advertent-Attention-condition. However, the pattern bears resemblance to the significant effect presented in Figure 10—i.e., when restrained eaters were identified with the RS-CD. This was also true for participants in the Inadvertent–Attention-condition. Again, although this pattern was similar to Figure 11 (RS-CD), the 2-way interaction effect (R^2 change = .02, p = .26) and the simple slopes (*p*s > .42) were not statistically significant.

Mediation. As in previous studies, the possibility of participants' weight satisfaction/self-esteem mediating the relationship between participants' restraint status (independent variable) and the eating/goal-related variables (food intake, LDT-variables, eating intentions) after IBM-exposure was considered. However, when collapsing the attention conditions, after controlling for pre-manipulation measures, participants' restraint scores (RS-CD or DIS) did not correlate significantly with the post-manipulation self-evaluation measures (rs < .17) in the IBM-condition (n = 87). Consequently, mediation was not considered possible in the total sample (Baron & Kenny, 1986). Similarly, in the inadvertent IBM-sample (n = 39), participants' restraint scores were not correlated with self-evaluation measures (rs < .13). Last, in the advertent IBM-sample (n = 48), after controlling for participants' pre-manipulation weight satisfaction, participants' DIS scores correlated significantly with their post-manipulation weight satisfaction (r = -.29). However, mediation was not possible because participants' post-manipulation weight satisfaction did not correlate significantly (rs < .22) with the outcome variables (food intake, LDT-reaction time, eating intentions) in this sample.

Subsample: Self-reported dieters

For exploratory purposes, self-reported dieters completed an additional four questions. As in Study 2, these four new questions and the other eight dependent variables were analysed. Because of the sample size, it was considered less feasible to conduct 3-way interactions. Therefore, only correlations (Table 26) and HMRs (Table 28) were conducted to test the main and interaction effects between the prime condition variable and the attention condition variable.

Preliminary analyses. First, there was a marginally significant positive correlation between dieters' age and their healthy eating intentions. However, because this correlation only reached marginal levels of significance, age was not entered as a covariate in the ANCOVA with healthy eating intentions as the dependent variable. Second, participants' BMI correlated significantly and positively with dieters' weight-loss goal (kg), goal difficulty, and negatively with their pre- and post-manipulation weight satisfaction. Consequently, BMI was controlled for in

Table 26

Correlation Matrix and Descriptive Statistics for the Subsample of Dieters in Study 3

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Age																
2	BMI	.03															
3	Weight-Loss Goal (kg)	.01	.71***														
4	Goal Effort	.02	.19	.28*													
5	Avoidance Difficulty	.09	.12	.14	-.14												
6	Goal Difficulty	.14	.28*	.47**	-.08	.36**											
7	Pre. Weight Sat.	.06	-.49***	-.66***	-.36**	.00	-.41**										
8	Post. Weight Sat.	.07	-.33**	-.57***	-.31*	.17	-.21	.79***									
9	Pre. Self-Esteem	.04	.10	-.06	.15	-.04	-.08	.21	.33**								
10	Post. Self-Esteem	.06	.07	-.08	.17	-.02	-.06	.18	.31*	.92***							
11	Av. Sav. Food words	.19	-.06	.03	.19	.01	.34**	-.11	-.02	.04	-.03						
12	Av. Sweet Food words	-.05	-.09	-.06	-.11	.20	.05	.23†	.11	-.07	.01	.01					
13	Av. Diet words	.05	-.06	-.05	-.28**	.03	.21	.10	.08	.05	.08	-.02	.42***				
14	Sweet Food Intake	.10	.15	.13	.16	-.03	.19	-.30*	-.24†	.03	.07	-.06	-.26†	-.07			
15	Savoury Food Intake	.15	.11	.19	.04	.08	.33*	-.40**	-.26†	-.04	.00	.00	-.26†	-.00	.31*		
16	Healthy Eating Intent.	.22†	.03	.11	.41**	-.07	.01	-.16	-.14	.18	.27*	.04	.07	-.18	-.01	.10	
	M	19.21	23.84	7.35	7.17	7.03	7.24	4.25	4.77	6.70	6.77	679.80	623.36	669.79	0.032	0.013	5.74
	SD	2.90	2.66	3.79	1.57	2.42	2.31	2.12	2.06	1.74	1.76	66.67	47.70	39.68	0.021	.0007	0.76

Note. For all three LDT analyses, participants' neutral word reaction time has been controlled for. Similarly, participants' hunger rating has been controlled for in the savoury food intake analysis.
All *r*-values < .001 have been rounded to .00.
†$p < .10$, *$p < .05$, **$p < .01$, ***$p < .001$.

the HMR analyses with weight-goal (kg) and weight-goal difficulty as the dependent variables. However, to avoid collinearity between covariates, because pre-manipulation weight satisfaction and BMI correlated significantly, BMI was not controlled for in the post-manipulation weight satisfaction model. Third, as in the main sample, participants' hunger was controlled for in the savoury (r = .30), but not sweet (r = .16) food intake analyses, neutral word reaction times in the LDT analyses (rs = .64) and pre-manipulation measures in the post-manipulation weight satisfaction and self-esteem analyses.

As in the main sample, there were significant positive correlations among pre- and post-manipulation weight satisfaction/self-esteem, and between dieters' sweet and savoury food intake during the taste test. Also mirroring the main sample, dieters' reaction time to avoid diet words in the LDT was positively correlated with their reaction time to avoid sweet food words in the LDT.

There were three statistically significant correlations among the dieting variables. Dieters' weight-loss goal (kg) correlated positively with their weight-goal effort and weight-goal achievement difficulty. Goal-achievement difficulty also correlated significantly and positively with their self-rated difficulty avoiding high-calories treats.

Two of the LDT-variables correlated significantly with dieters' goal-effort and goal-difficulty. First, there was a significant negative correlation between dieters' goal-effort and their reaction time to avoid diet words in the LDT. Second, dieters' self-reported goal difficulty correlated positively with their reaction time to avoid savoury food words.

Dieters' weight satisfaction (pre- and/or post-manipulation) correlated negatively with their weight-loss goal (kg), goal effort and their goal-achievement difficulty. Dieters' goal difficulty also correlated positively with their savoury food intake. Last, dieters' goal effort correlated positively with their healthy eating intentions.

There were also a number of correlations among the other variables in the subsample. For instance, there was a significant positive correlation between dieters' post-manipulation self-

esteem and post-manipulation weight satisfaction. Additionally, there was a marginally significant negative correlation between dieters' food intake (sweet and savoury) during the taste test and their avoidance of sweet food words during the LDT. Their food intake also correlated negatively with their pre-and post-manipulation (marginally significant) weight satisfaction. Last, dieters' reaction time to avoid sweet food words in the LDT also correlated positively with their pre-manipulation weight satisfaction (marginally significant).

Manipulation conditions: Main and interaction effects. Next, twelve HMR analyses were conducted to examine whether or not the experimental prime variable or the attention condition variable (and the interaction between the two) significantly affected the dependent variables. As above, where appropriate, covariates were entered into the models. Descriptive statistics are in Table 27. As in all other regression analyses, apart from the R^2 change values relevant to each step, Table 28 only contains final step statistics.

Multicollinearity between the attention condition variable, the prime variable and the interaction term (attention variable x prime variable) was not problematic (VIFs < 2.36, tolerances > .42). Although the majority of the regression assumptions (e.g., linearity and homoscedasiticity) were not violated, the homogeneity of regression slopes assumption was violated for two of the dependent variables in this subsample.

Dieters' BMI significantly interacted with the attention condition variable to predict their weight loss goal (kg) and their self-reported goal-achievement difficulty (*F*s > 5.23, *p*s < .04). Therefore, BMI was removed from these two models and any effects will be interpreted with caution (Stevens, 1996).

As can be seen in Table 28, over and above the variance accounted for by the covariates, entering the main effects into the models only contributed a significant amount of variance (2%) to the model predicting dieters' reaction time to avoid the diet words during the LDT.

Table 27
Descriptive Statistics for the Dependent Variables in Study 3's Subsample of Dieters

		Inadvertent		Advertent		Total	
		Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**
Weight-Goal Effort	**IBM**	7.00	1.49	6.89	1.79	6.93	1.67
	Neutral	8.06	1.20	6.71	1.45	7.38	1.48
	Total	7.67	1.39	6.81	1.62		
Diff. Avoid. Temptation	**IBM**	7.60	2.32	6.63	3.00	6.97	2.78
	Neutral	6.29	2.05	7.88	1.90	7.09	2.11
	Total	6.78	2.21	7.22	2.59		
Goal Difficulty	**IBM**	7.60	5.69	7.68	4.10	7.64	3.50
	Neutral	7.19	4.38	6.59	4.35	6.89	3.06
	Total	7.39	3.56	7.13	2.99		
Weight-Loss Goal	**IBM**	9.08	6.42	6.87	4.62	7.97	3.95
	Neutral	8.17	4.94	6.05	4.91	7.11	3.45
	Total	8.62	4.01	6.46	3.37		
Weight Satisfaction	**IBM**	4.87	3.30	4.82	2.41	4.84	2.05
covariate: pre weight sat.	**Neutral**	4.56	2.63	4.89	2.63	4.73	1.83
	Total	4.72	2.10	4.85	1.80		
Implicit Self-esteem	**IBM**	6.89	1.75	6.67	1.28	6.79	1.09
covariate: pre self-esteem	**Neutral**	6.90	1.34	6.66	1.39	6.78	0.97
	Total	6.89	1.06	6.68	0.94		
Av. Sav. Food Words	**IBM**	668.88	156.74	678.80	115.37	666.78	99.09
covariate: neutral word react.	**Neutral**	664.68	121.01	689.16	128.23	683.80	85.83
	Total	666.78	97.19	676.92	88.45		
Av. Sweet Food Words	**IBM**	647.40	117.91	627.69	86.78	637.55	73.14
covariate: neutral word react.	**Neutral**	608.69	91.07	624.25	96.49	616.47	66.55
	Total	628.04	74.54	625.97	64.55		
Av. Diet Words	**IBM**	682.85	100.60	686.96	74.00	684.91	62.41
covariate: neutral word react.	**Neutral**	664.99	77.65	644.12	82.25	664.56	56.77
	Total	673.92	63.60	665.54	55.01		
Sweet Food intake	**IBM**	0.035	0.028	0.030	0.019	0.032	0.022
	Neutral	0.038	0.022	0.027	0.017	0.032	0.020
	Total	0.037	0.024	0.029	0.018		
Savoury Food intake	**IBM**	0.008	0.016	0.012	0.016	0.010	0.007
covariate: hunger	**Neutral**	0.018	0.016	0.011	0.016	0.015	0.007
	Total	0.013	0.016	0.012	0.007		
Healthy Eat. Intentions	**IBM**	5.75	0.82	5.71	0.61	5.72	0.82
	Neutral	5.71	0.69	5.79	0.99	5.75	0.84
	Total	5.72	0.73	5.75	0.80		

Note. Where covariates have been controlled for, the descriptive statistics have been adjusted for the covariates' influence.

Table 28

Main and Interaction Effects of the Experimental Prime and Attention Condition Variables on the Dependent Variables in the Subsample of Dieters in Study 3

		R^2 change	df	F	β	b	p
Weight-Goal Effort							
1	Exp. Prime cond.	.09	1, 59	0.14	0.06	0.19	.71
	Attention cond.		1, 59	6.84	0.43	1.35	.01
2	Prime x Attention	.04	1, 59	2.53	-0.29	-1.25	.12
Goal Difficulty							
1	Exp. Prime cond.	.04	1, 59	1.42	0.20	0.93	.24
	Attention cond.		1, 59	0.14	0.06	0.29	.71
2	Prime x Attention	.00	1, 59	0.01	-0.02	-0.13	.92
Weight Satisfaction							
1	Pre. Weight Sat.	.62***	1, 57	78.85	0.77	0.74	.00
2	Exp. Prime cond.	.00	1, 57	0.02	-0.02	-0.07	.88
	Attention cond.		1, 57	0.46	-0.08	-0.32	.50
3	Prime x Attention	.00	1, 57	0.29	0.07	0.37	.59
Av. Savoury Food Words							
1	Neutral Word React.	.39***	1, 56	33.41	0.61	0.79	.00
2	Exp. Prime cond.	.00	1, 56	0.69	-0.12	-0.02	.41
	Attention cond.		1, 56	0.42	-0.09	-0.01	.52
3	Prime x Attention	.00	1, 56	0.42	0.10	0.02	.52
Av. Diet Food Words							
1	Neutral Word React.	.80***	1, 56	261.79	0.92	1.01	.00
2	Exp. Prime cond.	.02*	1, 56	7.51	0.21	0.02	.01
	Attention cond.		1, 56	2.92	0.13	0.01	.09
3	Prime x Attention	.01	1, 56	1.49	-0.10	-0.02	.23
Savoury Food Intake							
1	Hunger	.12**	1, 56	12.81	0.42	0.15	.00
2	Exp. Prime cond.	.06	1, 56	0.10	0.05	0.13	.76
	Attention cond.		1, 56	5.56	0.37	0.97	.02
3	Prime x Attention	.09*	1, 56	6.85	-0.46	-1.61	.01
Difficulty Avoiding Temptations							
1	Exp. Prime cond.	.01	1, 59	2.46	-0.26	-1.25	.12
	Attention cond.		1, 59	3.76	-0.33	-1.59	.06
2	Prime x Attention	.07*	1, 59	4.24	0.39	2.56	.04
Weight-Loss Goal							
1	Exp. Prime cond.	.07	1, 59	0.02	0.02	0.16	.90
	Attention cond.		1, 59	0.49	0.12	0.88	.49
2	Prime x Attention	.02	1, 59	1.48	0.23	2.33	.23
Implicit Self-Esteem							
1	Pre. Self-esteem	.85***	1, 57	324.61	0.92	0.93	.00
2	Exp. Prime cond.	.00	1, 57	0.02	0.01	0.04	.88
	Attention cond.		1, 57	0.99	0.07	0.24	.32
3	Prime x Attention	.00	1, 57	0.02	-0.01	-0.05	.89
Av. Sweet Food Words							
1	Neutral Word React.	.72***	1, 56	151.29	0.86	0.98	.00
2	Exp. Prime cond.	.01	1, 56	0.11	0.03	0.00	.74
	Attention cond.		1, 56	0.65	-0.08	-0.01	.42
3	Prime x Attention	.01	1, 56	1.44	0.13	0.02	.24
Sweet Food Intake							
1	Exp. Prime cond.	.05	1, 56	0.51	0.12	0.39	.48
	Attention cond.		1, 56	2.47	0.27	0.27	.12
2	Prime x Attention	00	1, 56	0.13	-0.07	-0.07	.72
Healthy Eating Intentions							
1	Exp. Prime cond.	.00	1, 59	0.10	-0.06	-0.08	.75
	Attention cond.		1, 59	0.11	-0.06	-0.09	.74
2	Prime x Attention	.00	1, 59	0.10	0.06	0.13	.75

Note. Apart from the R^2 change values, all other values are taken from the last step of each analysis. Any values < 0.001 have been rounded to 0.00. The degrees freedom differ between models because of covariates or missing data. *p < .05, **p < .01, ***p < .001.

Inspection of Step 2 statistics showed that this reaction time was influenced by which experimental prime condition participants were in. That is, regardless of the attention participants paid to the images, dieters in the Neutral-condition were significantly faster to avoid these words than dieters in the IBM-condition were (see Table 27 for descriptive statistics). This main effect was not qualified by a statistically significant 2-way interaction between the experimental prime condition variable and the attention condition variable.

Over and above any covariates, the interaction between the attention condition variable and the prime condition variable accounted for an additional significant amount of variance in two of the regression models. First, after controlling for participants' level of hunger, this interaction variable explained a significant 9% additional variance in the model predicting dieters' savoury food intake during the taste test (see Table 27 for descriptive statistics). Participants in the Inadvertent-Attention-condition drove this main effect (Figure 13). Mirroring the significant effect obtained in the main sample, dieters ate significantly less when they had been inadvertently exposed to IBM- rather than Neutral-images, $F(1, 24) = 10.75$, $p < .01$, $\eta^2 = .31$. In comparison, dieters did not consume a significantly different amount of food after advertent IBM-exposure, compared to Neutral-exposure, $F(1, 31) = 0.11$, $p = .74$, $\eta^2 = .00$.

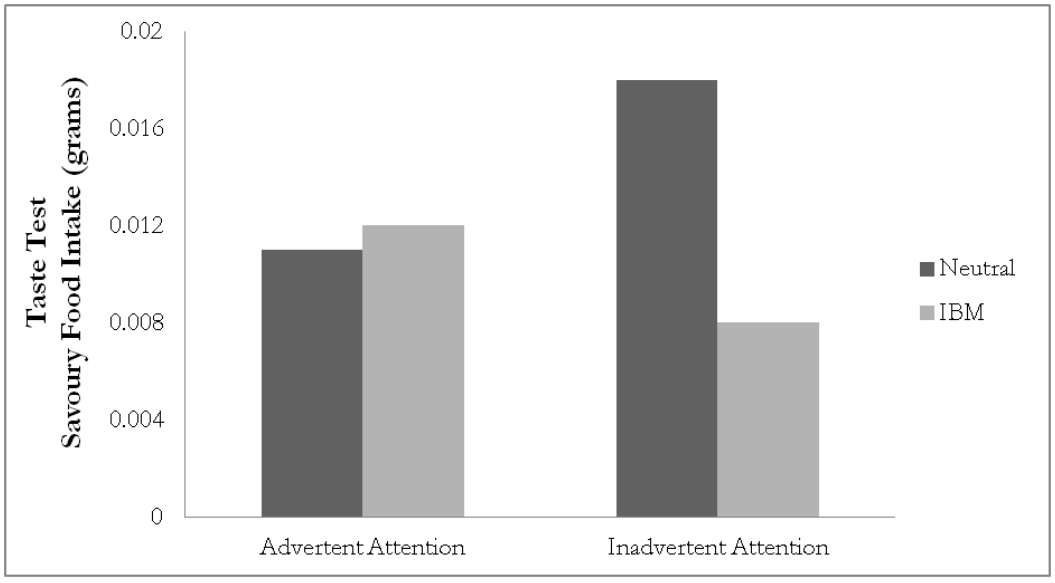

Figure 13. Interactive effect of the experimental prime and attention condition variables on dieters' savoury food intake during the taste test

Second, the experimental prime condition variable and attention condition variable also interacted to predict dieters' self-rated difficultly to avoid high-calorie foods. However, when broken down, participants' ratings did not significantly differ between the IBM- and Neutral-conditions in either the Advertent-Attention-condition, $F(1, 34) = 2.17$, $p = .15$, $\eta^2 = .06$, or the Inadvertent-Attention-condition, $F(1, 25) = 2.32$, $p = .14$, $\eta^2 = .09$.

Discussion

Participants' dietary restraint status had some effect on their response to three of the dependent variables. First, in comparison to unrestrained eaters, restrained eaters identified with the RS-CD consumed a marginally significant higher amount of sweet (but not savoury) food during the taste test (n.b., this effect was qualified, see below). Second, restrained eaters identified with either scale (RS-CD or DIS) reported statistically significant healthier eating intentions after the taste test. Last, participants' DIS scores were related to lower levels of weight satisfaction (marginally significant). In contrast to Study 2, participants' restraint scores were not related to any of the LDT variables. This (lack of) finding counters Fishbach and Shah's (2006) reasoning. That is, participants who scored higher on the restraint scales were expected to avoid the food words faster—and avoid the diet words slower—than those who scored lower on the scales. Additionally, the experimental prime condition variable did not significantly affect participants' responses to any of the dependent variables in the main sample. However, it is noteworthy that in the dieting subsample, dieters exposed to IBM (vs. Neutral-images) were significantly slower to avoid diet words in the LDT.

Although there were some statistically significant main effects and interactions between the attention and the experimental prime condition variables, I concentrated upon the moderating role (if any) of participants' dietary restraint status in this discussion. Namely, the focus is upon the hypothesised 3-way interaction effect between the dietary restraint status variable, attention condition variable and experimental prime condition variable. In line with control theory (and Studies 1 and 2), advertent IBM-exposure was hypothesised to trigger

negative self-evaluations and dietary restraint (taste test, LDT and healthy eating intentions) among successful and unsuccessful restrained eaters (i.e., a 3-way interaction). Alternatively, inadvertent IBM-exposure was hypothesised to buffer restrained eaters from experiencing negative self-evaluations and, therefore, cause unsuccessful (but not necessarily successful) restrained eaters to show poorer self-regulation (taste test, LDT and healthy eating intentions). However, the majority of the hypothesised 3-way interaction effects were not statistically significant.

In saying that, for the sweet food intake dependent variable there was a statistically significant 3-way interaction between participants' RS-CD scores, the experimental prime condition variable and the attention condition variable. Nevertheless, the obtained pattern of behaviour was at odds with the hypothesis. For participants who had been advertently exposed to Neutral-images their restraint status did not significantly affect their food intake. However, restrained eaters who advertently viewed the IBM-images consumed significantly more sweet food than unrestrained eaters did. In comparison, restrained eaters who were inadvertently exposed to Neutral-images consumed significantly more food than unrestrained eaters consumed. On the contrary, inadvertently viewing IBM appeared to buffer these restrained eaters from eating more than unrestrained eaters. This pattern is noteworthy because, as previously mentioned, unsuccessful restrained eaters generally show poor dietary regulation when confronted by tempting foods (Hoffmann et al., 2010; Stroebe et al., 2008). Furthermore, although previous researchers have connected IBM-exposure with successful restrained eaters' dietary restraint (Anschutz, van Strien et al., 2008), the data patterns in Study 3 are the first indication that viewing IBM might help unsuccessful restrained eaters restrain their eating.

Overall, restrained eaters seemed to eat more than others when advertently, rather than inadvertently, exposed to IBM. As noted, in the Results these patterns remained similar (but nonsignificant) when participants' RS-CD restraint scores (unsuccessful restraint) were

substituted with their DIS scores (successful restraint). Therefore, although similar, this interaction effect was more pronounced among unsuccessful restrained eaters.

In addition, although not directly related to the hypothesis, the effect that the inadvertent IBM-exposure had upon unrestrained eaters is noteworthy. In comparison to restrained eaters, unrestrained eaters tended toward (n.b., the simple slope was not statistically significant) eating more sweet food when they viewed IBM inadvertently. Ironically, unrestrained eaters behaved most in line with the hypothesis formulated about restrained eaters. Unrestrained eaters showed signs of dietary restraint in response to advertent IBM-exposure, but eating after inadvertent IBM-exposure.

As in Study 2, I also explored how a subsample of self-reported dieters responded to the experimental manipulations in Study 3. In Study 2, dieters (advertently) exposed to IBM reported significantly more weight-goal effort than dieters in the Neutral-condition did. However, because this effect did not replicate in Study 3, it is possible that demand characteristics (e.g., not testing the dieting variables in an ***unrelated*** study) inflated this significant effect in Study 2. However, in Study 3's taste test, dieters who inadvertently saw the IBM (vs. Neutral-images) consumed significantly less savoury food. This finding is noteworthy because dieters' food intake mirrors the restrained eaters' sweet food intake outlined above.

Accounting for participants' self-evaluations. As in Study 2, in Study 3 I included two indices of self-evaluation (weight satisfaction and implicit self-esteem). Evidently, the data obtained in Study 3 were not consistent with the self-evaluation hypotheses. Advertent IBM-exposure did not make the restrained eaters feel significantly worse than the other participants. Consequently, because no statistically significant 3-way interaction effects were obtained, I cannot say that inadvertent IBM-exposure buffered restrained eaters from such negative effects.

In Study 1, restrained eaters advertently exposed to IBM recorded lowered weight satisfaction and increased negative mood. Within the current literature, this data in Study 1 provided the first indication that compared to other women, negative IBM-effects can be

magnified among restrained eaters. I argued that these negative effects were triggered by the high level of attention paid to IBM. However, the data obtained in Studies 2 and 3 were not entirely consistent with this argument. In Study 2, participants directed the same high level of attention toward IBM. Nevertheless, participants' restraint status and the experimental prime condition variable did not interact to predict a significant amount of their weight satisfaction or implicit self-esteem. In Chapter 4, this result was attributed to the post-test only design implemented in Study 2. Had I included pre-test measures in Study 2, it was argued that restrained eaters might have reported similar (Study 1) negative effects. In comparison, as in Study 1, I incorporated a pre-test/post-test design into Study 3 and exposed half of the participants to the same manipulation (i.e., advertent-exposure). Even so, the results obtained in Study 1 were not replicated in Study 3's Advertent-Attention-condition.

In light of such nonsignificant results in the current study, the lack of statistically significant results obtained in Study 2 cannot be solely attributed to the post-test only design. These distinct results might be accounted for by other differences between the three studies. These include differences between the comparison conditions, sample characteristics and outcome measures. Because such a discussion involves detailed comparisons between the three studies, I have discussed these possibilities in the General Discussion (Chapter 6).

Accounting for participants' eating-related behaviour. Several variables were included to investigate participants' eating behaviour after IBM-exposure. These were the LDT-savoury and sweet food word variables (and diet word variable), the taste test and participants' self-reported healthy eating intentions. Only one statistically significant 3-way interaction effect was obtained in the main sample. As outlined, participants' RS-CD scores significantly interacted with the attention condition variable and the experimental prime condition variable to predict participants' sweet food intake during the taste test. Similarly, in the dieting subsample, the attention and experimental prime condition variables interacted to predict dieters' savoury food intake during the taste test. This group of significant and nonsignificant findings imply that IBM-

exposure and participants' attention might only interact to significantly affect restrained eaters' and dieters' immediate food intake (during the taste test), rather than their subsequent healthy intentions. In contrast to speculations drawn in Study 2, these results also imply that deliberate self-control (i.e., taste-test behaviour) may not always have implicit connections (i.e., LDT results). As above, accounting for these eating-related hypotheses and results necessitates a detailed discussion of Studies 1, 2 and 3. As with the inconsistent self-evaluation results, different eating-related results might also be attributed to differences in experimental design, measurement and sample characteristics. Additional ideas (e.g., eating attention) are also considered in Chapter 6. However, I examined the inconsistent LDT (Studies 2 vs. 3) and taste test results (Studies 1 vs. 3) below.

From previous research (e.g., Fishbach & Shah, 2006), the joystick LDT presented as a valid and novel way to measure restrained eaters' implicit approach and avoidance tendencies. As mentioned in Chapter 4, participants in previous studies consistently tended to approach positive, but avoid negative stimuli (e.g., Duckworth et al., 2002). Building on such research, Fishbach and Shah (2006) validated the joystick LDT in a series of experiments. That is, pushing the joystick away from oneself signified stimulus avoidance, and pulling signified stimulus approach.

Compared to other participants in Study 2, the restrained eaters (RS-CD) exposed to the IBM-slideshow were significantly faster to avoid (push away) sweet food words during the joystick LDT. This significant effect did not replicate in Study 3's Advertent-condition (i.e., a replica of Study 2's manipulation). Although I acknowledge that Fishbach and Shah (2006) previously validated the task, it is still possible that restrained eaters in the IBM-condition only appeared to be avoiding the sweet food words in Study 2. Consequently, the results might be interpreted differently. Possibly, IBM-exposure actually made restrained eaters ***react*** to these food words faster than the other participants. Conceivably the joystick LDT did not serve as a measure of approach and avoidance, but a reaction-time measure. The statistically significant

correlational results obtained in Study 3 are consistent with this speculation. Participants (including dieters) who were quick to avoid food words in the LDT consumed a high amount of food during the taste test. Perhaps these correlations would not be counterintuitive if the LDT was conceptualised as a reaction time, rather than an avoidance measure. Furthermore, in hindsight, counterintuitive correlations obtained in Study 2 (i.e., healthy food choices and LDT-variables) are also consistent with this idea. Nevertheless, this conceptualisation does not account for the lack of statistically significant LDT results (interaction effects) obtained in Study 3. Comparing the significant and nonsignificant data patterns obtained in Studies 2 and 3 to previous researchers' data patterns, the task seems to provide inconsistent results. The task does not appear to be a robust measure of approach and avoidance tendencies.

The taste-test results were also inconsistent between the experiments. Because participants' attention was not manipulated in Study 1, the 3-way interaction effects that were tested in Study 3 cannot be compared with the data in Study 1. However, the 2-way interaction effects (Advertent-Attention-condition) can be compared between studies. As in Study 1, in Study 3's Advertent-condition (i.e., a replica of Study 1's manipulation), the 2-way interaction effect between participants' restraint status (DIS or RS-CD) and the experimental prime condition variable did not predict a significant amount of variance in participants' sweet food intake. However, because the 3-way interaction effect (RS-CD) was statistically significant in this third experiment, the 2-way interaction was graphed (Figure 11). Restrained eaters' (RS-CD) consumed significantly more sweet food than unrestrained eaters did after advertent IBM-exposure in Study 3 (i.e., the simple slope was statistically significant). Because the interaction effect was not significant in Study 1, there was no reason to explore such slopes. However, an exploratory analysis suggested that participants' restraint score (RS-CD) was not significantly related to their food intake in Study 1's IBM-condition (r = -.11).

Various procedural or design differences between Studies 1 and 3 might account for the inconsistent taste-test results. Obviously, the comparison conditions differed between studies.

However, because the interaction effect (experimental prime condition variable x restraint variable) was not statistically significant in either study this difference in comparison conditions may not have been a large influence. There were also other differences between the two studies. Suspicious participants were not coded in Study 1, whereas in Study 3 they were coded and excluded from the main analyses. However, although not reported in the Results section, the 2-way interaction effects (experimental prime condition variable x restraint status) predicting participants' food intake in Study 3's Advertent-Attention-condition (replica of Study 1) were not statistically significant without (or with) suspicious participants in the sample.

The differences in taste-test design might be the most likely reason for the inconsistent taste-test results. As mentioned previously, following other researchers, in Study 3, participants were not anticipating food intake prior to the taste test (e.g., Mills et al., 2002), were only tested between 11am-6pm (e.g., Jansen & de Vries, 2002) and were given a variety of foods (e.g., Strauss et al., 1994). Previous researchers have shown that participants get bored when they are only offered one type (vs. a variety) of food and that this boredom triggers a significant decrease in consumption (Hetherington, Foster, Newman, Anderson, & Norton, 2006; Norton, Anderson, & Hetherington, 2006). When an individual no longer finds a food pleasant, they look for another type of food to consume. Therefore, the participants in Study 1—in particular unsuccessful restrained eaters advertently exposed to IBM (i.e., the effect referred to above)—may have wanted to consume more high-calorie food than they actually consumed. Because such participants only had chocolate to choose from, they may have habituated to this food and eaten less. This confound may have masked restrained eaters' natural eating behaviour in Study 1.

Nonconscious goal pursuit. The significant taste-test results obtained in Study 3 were not in the hypothesised direction. The restrained eaters' behaviour was unexpected. Restrained eaters tended toward dietary restraint after inadvertent, rather than advertent IBM-exposure. This pattern was stronger (and statistically significant) among unsuccessful, compared to successful restrained eaters. In a way, these results are similar to a series of results obtained by

Papies and her colleagues. They found that inadvertent exposure to diet advertisements (without IBM) encouraged restrained eaters (RS) to restrain their eating (Papies & Hamstra, 2010; Papies, Stroebe, & Aarts, 2008). Papies et al. interpreted their results alongside the theory of nonconscious goal pursuit. This is the idea that goals can be primed outside of awareness and that self-regulation can be enhanced (Aarts, 2007; Greenwald & Banji, 1995). Accordingly, Papies et al. speculated that the diet advertisements activated restrained eaters' dietary-restraint goal without their knowledge. In contrast to my hypothesis, perhaps (rather than having restrained eaters and self-reported dieters focus on IBM, i.e., advertent exposure that triggered restrained eaters' eating in Study 3) fleeting glances at IBM may trigger restrained eaters' nonconscious goal pursuit (i.e., dietary restraint during the taste test).

However, I am not the only researcher to have inadvertently exposed unsuccessful restrained eaters to IBM and measured their food intake (e.g., Strauss et al., 1994). Comparisons between my research and such previous research offer further hints about restrained eaters' IBM-related behaviour. For dietary restraint to prevail, perhaps unsuccessful restrained eaters need an environment that promotes mindful eating (i.e., like the taste test). Briefly, perhaps inadvertent IBM-exposure did subconsciously remind unsuccessful restrained eaters of their dietary goal in previous studies, but they ate more than other participants ate because the eating environment (i.e., distracted while watching television) was not conducive with dietary restraint (e.g., Warren, Strauss et al., 2005). This concept is discussed in detail throughout Chapter 6.

Limitations. Chapter 6 contains a detailed discussion of the limitations within Study 3. Briefly, it was a limitation that a relatively high number of participants were excluded from the main data analyses in Study 3. In saying that, although not reported in the Results section, it is important to note that the majority of the hypothesised 3-way interaction effects did not change when either suspicious participants or participants with BMIs exceeding 30 were included in the analyses (for exception see, footnote 53, p. 157). Still, perhaps the manipulation can be tweaked so that fewer participants are lost from the Inadvertent-condition. That is, although the majority

of participants in the Inadvertent-condition did notice the slideshow of images, 14 participants did not. In addition, it was obviously a limitation that random assignment was somewhat unsuccessful in this third experiment. Between the experimental conditions, participants differed in their weight satisfaction, DIS scores and BMI. As noted, to avoid violating statistical assumptions, some of these between-group differences could not be controlled for because such variables were not significantly correlated with the majority of the dependent variables.

Chapter 6

General Discussion

Sociocultural theory was a catalyst for the studies in this thesis. Sociocultural theorists suggest that thin images of women in the media detrimentally affect women's self-evaluations, mood and eating behaviours (Rodin et al., 1985; Striegel-Moore et al., 1986). Although meta-analytic results are consistent with this premise (e.g., Grabe et al., 2008), a number of authors (e.g., Hargreaves & Tiggemann, 2002; Tiggemann & McGill, 2004) have argued that sociocultural theory is too broad and that more attention needs to be given to moderating variables. Because vulnerable subgroups of women respond differently to IBM-exposure (e.g., Posavac et al., 1998), I conducted three studies to investigate how viewing IBM might affect restrained eaters. Overall, my between-study findings were inconsistent. Under some specific circumstances (outlined below), IBM-exposure seemed to negatively affect restrained eaters' self-evaluations and food intake. In discussing the implications of the results, limitations of my own research and similar studies conducted by other research groups were considered.

Dietary Restraint Scales

Past researchers (e.g., Anschutz, van Strien et al., 2008) implied that the inconsistent literature on restrained eaters' IBM-related food intake might (in part) be explained by the different restraint scales used. That is, researchers that have used the RS typically find that IBM-exposure is related to higher food intake among restrained eaters (e.g., Strauss et al., 1994), whereas researchers who have used the DEBQ-R have failed to find such an effect (Anschutz, Engels et al., 2009; Anschutz, van Strien et al., 2008). Therefore, two different restraint scales were used in the current studies. Before analysing the experimental results, I conducted several cross-sectional analyses. Both the DIS and the RS-CD identified women with body-image concerns, but participants' RS-CD scores were related to more unsuccessful diet variables (e.g., low self-control and perceived self-regulatory success in dieting). As will become apparent throughout the proceeding discussion, the majority of significant and nonsignificant results were

similar for either restraint measure. However, consistent with Anschutz, van Strien et al.'s (2008) speculation, patterns implied that unsuccessful restrained eaters (RS-CD) might be more sensitive to negative eating effects after IBM-exposure. The choice of restraint scale is an important variable and should be considered so by future researchers in this area.

Restrained Eaters' Self-Evaluation and Negative Mood

The self-evaluation and mood results were inconsistent between the three experiments. In Study 1, restrained eaters (DIS and RS-CD) who studied IBM-images reported a statistically significant decrease in weight satisfaction and a significant increase in implicit negative mood. These results were consistent with the self-evaluative component of the negative contrast effect, rather than the thinness fantasy effect. However, in Studies 2 and 3, advertently studying IBM-images did not have a statistically significant effect upon participants' weight satisfaction or implicit self-esteem. Additionally, inadvertent IBM-exposure in Study 3 did not have a significant effect upon participants' weight satisfaction or implicit self-esteem either. There were several differences between the three experimental designs that may have contributed to these inconsistencies.

Suspicious participants. First, in Studies 2 and 3, data obtained from participants who were suspicious of, or connected the experimental manipulation and the measurement of the dependent variables, were not analysed. In comparison, in Study 1 I only eliminated (and coded for) participants who directly connected the manipulation and dependent variables. Considering demand characteristics, one could argue that significant negative effects were more likely to occur in Study 1, rather than in Studies 2 and 3, because Study 1 may have contained suspicious participants. However, including suspicious participants in Study 2 did not change the significance levels of the interaction effects predicting the self-evaluation (or other) dependent variables. Nevertheless, including suspicious participants in Study 3's HMR analyses did affect the results obtained when restrained eaters had been identified with the DIS (see footnote 53, p. 157). That is, the 3-way interaction (experimental prime variable x attention variable x restraint

variable) significantly predicted a small amount of variance in participants' weight satisfaction. However, breaking this significant 3-way interaction down and repeating Study 1's analysis (DIS score x experimental prime condition variable) in the Advertent-Attention-condition with suspicious participants included (i.e., like Study 1), did not account for a significant amount of participants' weight satisfaction as in Study 1. If demand characteristics were at play then these restrained eaters might have reported lowered satisfaction, but they did not. Therefore, I can assume that the presence of demand characteristics and the good-subject effect (Nicholas & Maner, 2008) did not influence the between-study inconsistent results.

Comparison conditions. Second, the comparison conditions differed between the three studies. In Study 1, the comparison images were the same as the IBM-images, minus the thin models (i.e., Control-condition). Because of the similarity between these conditions, a new Neutral-condition (e.g., images of furniture) was added to Study 2. In turn, because the participants in the IBM- and Control-conditions behaved similarly in the healthy food choice test in Study 2, the Control-condition was not included in Study 3. However, these changes in conditions also appear to be an unlikely explanation for the inconsistent self-evaluation results. To begin with, the inconsistent results between Studies 1 and 2 did not involve the added Neutral-condition. For example, the interaction effect between the restraint variable and experimental prime condition variable involving the IBM-condition and the Control-condition significantly predicted participants' weight satisfaction in Study 1, but not in Study 2. Furthermore, Neutral-images were chosen to be distinct from the IBM-images. Therefore, any difference between participants exposed to the IBM- and Neutral-images (Studies 2 and 3) should have been more pronounced (rather than nonsignificant) than the significant difference between participants exposed to the IBM- and Control-images in Study 1.

Sample differences. Third, differences between the samples in my studies may have contributed to the inconsistent results. Although participants between the studies were of similar age and had similar BMIs and restraint scores (see Tables 6, 12 and 22), only 9% of the sample in

Study 1 were Psychology students, compared to 79% of the sample in Study 2 and 96% of the sample in Study 3. Most Psychology participants were first-year students; this means that their knowledge of psychological research was limited. Nevertheless, these students will have been less naïve to psychology research than were non-Psychology students. This could potentially affect the results in two opposite ways. First, it is possible that Psychology students are more vulnerable to the good-subject effect as they are perhaps more likely to find out or guess what the research is about. This is an unlikely explanation for the inconsistent findings in the current research because: (a) suspicious participants were excluded from all analyses, and (b) negative IBM-effects, consistent with the good-subject effect, were not obtained in Studies 2 and 3. Alternatively, because of their (limited) background in psychology research, Psychology students may have been more cautious and not as (intentionally or unintentionally) honest in their responses. They may have buffered themselves from experiencing or reporting negative effects. This is also not a very likely explanation for the inconsistent results as Psychology samples in other studies (with minimal demand characteristics) do report negative IBM-effects (e.g., Hawkins et al., 2004). Moreover, King, Bailly, and Moe (2004) investigated differences between Psychology and non-Psychology students and found that both groups were relatively similar on a number of characteristics (e.g., they reported similar rates of eating disorders and depression), leading them to conclude that relying on Psychology participant pools should not bias behavioural science research results. Therefore, I do not think that Studies 2 and 3's lack of negative effects should be attributed to the overrepresentation of Psychology students in these samples.

Outcome measures. Finally, in Study 1, after controlling for pre-manipulation weight satisfaction and main effects, the interaction between participants' dietary restraint status (RS-CD or DIS) and the experimental condition variable accounted for a significant 2% of participants' weight satisfaction. Because this effect was small, it may have been difficult to detect/replicate in Studies 2 and 3. Indeed, interaction effects are harder to detect than main effects are (e.g., Evans,

1985; Morris, Sherman, & Mansfield, 1986). Consequently, moderator effects that existed in the data sets might have been missed (i.e., Type 2 error). Therefore, it is possible that the same effect was present, but undetected in Studies 2 and 3. Although possible, because each study had high levels of statistical power to detect medium-sized interaction effects, this explanation is also unlikely.

In contrast to this significant interaction effect for weight satisfaction, the same interaction effect (restraint variable x experimental prime condition variable) accounted for a larger amount of variance (5-10%) in participants' implicitly measured negative mood in Study 1. Had I kept negative mood as a dependent variable in all three studies, this significant interaction effect might have been replicated in Studies 2 and 3. This mood measurement was discontinued to reduce the time interval between the experimental manipulation and the measurement of the eating/LDT variables. However, considering that other researchers have not found a statistically significant interaction effect between participants' dietary restraint status and similar experimental condition variables for explicit mood measures (Mills et al., 2002; Strauss et al., 1994; Warren, Strauss et al., 2005), in hindsight, it may have been a valuable construct to keep. This is discussed in subsequent sections.

Restrained Eaters' Self-Evaluations, Mood and Dietary-Restraint Goals/Behaviours

In Study 1, participants paid attention to IBM- or Control-images and proceeded to focus on their food intake during a taste test. In this first experiment, I focused upon the thinness fantasy effect and the negative contrast effect. These effects are explanations for restrained eaters' unhealthy food consumption after IBM-exposure. To recap, proponents of the thinness fantasy effect argue that IBM-exposure sways restrained eaters to fantasise about their own thinness (e.g., Mills et al., 2002). These women feel momentarily happy about their own body size; consequently, they then allow themselves to indulge in tempting foods. In contrast, advocates of the negative contrast effect argue that restrained eaters feel negative about themselves after IBM-exposure and that this negative affect fuels subsequent eating (e.g., Seddon

& Berry, 1996). Although, advocates of both effects hypothesise that IBM-exposure triggers restrained eaters' eating, taking previous research into account (e.g., Anschutz, van Strien et al., 2008; Strauss et al., 1994), only unsuccessful restrained eaters (RS-CD) were hypothesised to eat more than others after IBM-exposure in Study 1.

As mentioned, compared to other participants, restrained eaters (RS-CD and DIS) in Study 1 reported significantly lower levels of weight satisfaction and higher levels of negative mood after IBM-exposure. However, successful (DIS) and unsuccessful (RS-CD) restrained eaters who were exposed to IBM ate a statistically similar amount of M&Ms as other participants ate in the taste test. Therefore, successful restrained eaters' (DIS) food intake was similar to the patterns obtained by previous researchers, i.e., not significantly affected (Anschutz, Engels et al., 2009). However, in comparison to previous research (e.g., Strauss et al., 1994), unsuccessful restrained eaters (RS-CD) inhibited their food intake in the taste test. In other words, although they did not restrain their food intake in comparison to other participants in Study 1, unsuccessful restrained eaters restrained their intake in comparison to the hypothesised effect and in comparison to other similar IBM-studies (e.g., Strauss et al., 1994). Evidently, this result is only consistent with the self-evaluative/mood (not subsequent eating) component of the negative contrast effect. At this early stage (i.e., Study 1), it was unclear why unsuccessful restrained eaters (RS-CD) had not eaten more than other participants had (e.g., Strauss et al., 1994). The thinness fantasy and negative contrast effects appeared to be too simplistic. The relationship between restrained eaters' self-evaluations, mood and their eating behaviour after IBM-exposure was obviously more complex.

Accordingly, control theory (Carver & Scheier, 1982) was used to design Study 2 and formulate the subsequent hypotheses. The general population—and therefore restrained eaters—have larger body-sizes than fashion and advertising models do (Fouts & Burggraf, 1999; Fouts & Burggraf, 2000). Consequently, when restrained eaters focus on the IBM (i.e., Study 1 advertent exposure) and compare their bodies to the models' bodies, the comparison will be

upward. This comparison means that restrained eaters might rate their own goal progress (i.e., acquiring a smaller body size) as weak, and might explain the negative effects that they reported in Study 1. In line with control theory, it was argued that restrained eaters in Study 1 used this negative affect to self-regulate during the taste test. However, because of Study 1's limitations (e.g., the similarity between the experimental prime conditions, the taste-test design and the implicit-mood measure placed between the primes and the taste test) it was also considered possible that participants' true eating behaviour had been masked. I attempted to rule these possibilities out in Study 2. In comparison to Study 1, in Study 2 I added a Neutral-condition, removed the implicit measure of mood and replaced the taste test with the implicit LDT and a healthy food choice test.

In Study 2 I examined whether or not IBM-exposure triggered restrained eaters' dieting goals and/or dietary restraint (LDT and healthy food choice test). Participants' restraint status (DIS or RS-CD) and the experimental prime condition variable did not significantly interact to predict participants' LDT diet-word reaction times. This nonsignificant effect suggested that IBM-exposure had not activated diet-related thoughts among restrained eaters' any more than it had for unrestrained eaters or significantly more than the comparison conditions had. However, restrained eaters (RS-CD) who saw the IBM-slideshow were significantly faster than other participants were to avoid sweet food words during the LDT. This significant effect was consistent with part of Study 2's hypotheses—that viewing IBM helped unsuccessful restrained eaters avoid temptations (i.e., sweet food words). These participants avoided sweet food words even though, in comparison to others, they did not report significantly higher negative self-evaluations after IBM-exposure. Additional exploratory analyses suggested that, if exposed to IBM-images (or Control-images), restrained eaters chose significantly healthier snacks in the food choice test than unrestrained eaters did. New to Study 2, a subsample of self-reported dieters was asked additional diet-goal questions. Dieters who saw the IBM-slideshow wanted to direct significantly more effort toward their weight-loss goals. Therefore, at the time (i.e., Study

2), IBM-exposure was speculated to improve restrained eaters' ability to avoid unhealthy foods (LDT and healthy food choice test) and the self-reported dieters' weight-goal effort.

Upon inspecting the results within previous IBM-eating studies where researchers also tested participants' dietary restraint status as a potential moderator—together with Studies 1 and 2—Study 3 was designed to test a revised hypothesis. Participants' IBM-related attention was manipulated in Study 3. Unlike Study 2, in Study 3 I included the LDT, a redesigned taste test and measured participants' healthy eating intentions (the healthy food choice test was eliminated).

It was hypothesised that advertent, but not inadvertent, attention to IBM would elicit negative self-evaluations among successful and unsuccessful restrained eaters. In turn, drawing upon control theory and existing research, unsuccessful restrained eaters were hypothesised to display dietary restraint after advertent, but not inadvertent exposure. In comparison, successful restrained eaters were hypothesised to display dietary restraint after both forms of exposure (advertent and inadvertent).

Inconsistent with such hypotheses, in comparison to other participants in the sample, neither advertent nor inadvertent IBM-attention caused restrained eaters to evaluate themselves significantly more negatively than other participants. Even so, patterns implied that, in comparison to others, unsuccessful restrained eaters (RS-CD) restrained their eating after inadvertent IBM-exposure, and ate more after advertent IBM-exposure. It is also noteworthy that the patterns were similar (nonsignificant) for successful restrained eaters (DIS). Therefore, regardless of participants' self-evaluations, a fleeting glance at (rather than studying) IBM might have buffered restrained eaters from IBM-induced eating. This pattern was partially reinforced in the subsample of dieters. Dieters ate significantly less savoury food after inadvertent exposure to IBM, rather than Neutral-images. This effect was not significant in the Advertent-Attention-condition.

Like the self-evaluation results, these dietary-restraint (behaviour and goals) results were inconsistent across Studies 1-3 and might be attributable to the different designs, sample characteristics, outcome measures, and/or taste-test designs. As mentioned, it is unlikely that the between-study inconsistencies are due to sample characteristics. However, as alluded to in Chapter 5, the taste test was more realistic in Study 3 (e.g., food variety) compared to Study 1. This improved design may have better captured participants' eating behaviour in Study 3. In addition, there are several other reasons that the data obtained throughout Studies 1-3 were not consistent with the eating-related hypotheses. That is, the distribution of restrained eaters in the samples, the outcome measures used in Study 2 (e.g., joystick LDT), participants' IBM-attention and participants' eating-attention.

Representation of restrained eaters. It is possible that restrained eaters in the current samples should only be considered moderately, rather than highly restrained eaters. In which case, perhaps the average restrained eater is not overly affected by IBM-exposure. Across the three experiments, the average RS-CD score was 7.82 (*SD* = 3.49). This average is comparable to Boerner et al.'s (2004) sample of American university students, but lower than some other samples of American university students (e.g., Allison, Kalinksky, & Gorman, 1992; Klem, Klesges, Bene, & Mellon, 1990). Although other IBM-researchers do not report descriptive statistics for the RS, they do report the number of highly restrained eaters and less highly restrained eaters. Past researchers divide participants into highly restrained and less highly restrained eaters (RS) using the cut-off score of 15 (e.g., Mills et al., 2002; Warren, Strauss et al., 2005). Using the same cut-off to determine high and low restrained eaters in the current three studies, I calculated that there were lower proportions of highly restrained eaters in the current studies than in other IBM-studies (e.g., Mills et al., 2002; Warren, Strauss et al., 2005). Consequently, perhaps the current hypotheses would better predict behaviour among more extreme samples (e.g., highly restrained eaters, problem eaters or obese participants). For example, it might be intriguing to replicate the experimental design of Study 3 among

participants with problematic eating tendencies. Maybe advertent IBM-exposure would trigger binge eating, and inadvertent IBM-exposure would trigger excessive dietary restraint. Investigating these sample differences would be a valuable avenue for future researchers to address.

Study 2 measures. Three results in Study 2 contributed to the formulation of the LDT, taste-test and eating-intention hypotheses in Study 3. The development of such hypotheses was mainly driven by the significant and nonsignificant LDT results in Study 2. That is, compared with other participants, unsuccessful (but not successful) restrained eaters exposed to IBM were significantly faster to avoid sweet food words in the LDT. Additionally, restrained eaters exposed to IBM-images (and Control-images) chose significantly healthier reimbursement snacks than unrestrained eaters did, and the self-reported dieters who were exposed to IBM rated their goal-effort significantly higher than others. These results seem to complement one another. That is, of those exposed to IBM, restrained eaters avoided food words and chose healthy snacks and dieters reported goal effort. However, as previously speculated, it is possible that the healthy food choice test and the dieting dependent variables were influenced by social desirability. Furthermore, as discussed in Chapter 5, the joystick LDT does not seem to be a reliable measure of participants' approach and avoidance tendencies. In hindsight, perhaps the hypotheses formulated in Study 3 were misguided by the data gathered in Study 2.

IBM-attention. Based upon comparisons with Studies 1 and 2, I grouped six previously published IBM-eating studies into full attention (Studies 1 & 2), and less than full attention categories (Anschutz, Engels et al., 2009; Anschutz, van Strien et al., 2008; Mills et al., 2002; Seddon & Berry, 1996; Strauss et al., 1994; Warren, Strauss et al., 2005). These categories played a role in hypothesis development throughout this thesis. Upon interpreting Study 3's results, these six IBM-eating studies might be regrouped. That is, the studies by Mills et al. (2002) and Seddon and Berry (1996) could be reclassified.

Participants in Mills et al.'s (2002) and Seddon and Berry's (1996) studies paid relatively less attention to IBM than participants in Studies 1 and 2 did (see Chapter 3). However, participants in Mills et al.'s and Seddon and Berry's studies paid relatively more attention to IBM than participants in the other four IBM-eating studies did (Anschutz, Engels et al., 2009; Anschutz, van Strien et al., 2008; Strauss et al., 1994; Warren et al., 2005). The research groups in these four studies presented participants with IBM-commercial breaks in a film. In a sense, participants viewed the IBM somewhat unconsciously. It was logical that these four studies be grouped together. In contrast, Mills et al.'s and Seddon and Berry's experimental designs differed from these studies. As previously outlined, Mills et al. had participants complete a consumer evaluation survey about the prime images. Whereas, although Seddon and Berry did present participants with IBM via commercial breaks, the experimental design differed from the four designs referenced above (Anschutz, Engels et al., 2009; Anschutz, van Strien et al., 2008; Strauss et al., 1994; Warren, Strauss et al., 2005). In Seddon and Berry's study, participants were told that they would be asked questions about the prime images later in the experiment. Although, participants never actually completed these questions, the intention, and therefore the attention, was there.

Therefore, although previously justified (Chapter 3), Mills et al.'s (2002) and Seddon and Berry's (1996) studies could be classified differently. It is possible that participants in these two studies attended to the IBM somewhat consciously, rather than unconsciously. Consequently, it is liable that my original classification contributed to some of the unconfirmed hypotheses throughout this thesis. This possibility is explained in the following sections.

Eating-attention. Earlier in this thesis, the inconsistent IBM-eating literature (Studies 1 and 2 vs. existing IBM-eating literature) was attributed to the attention participants paid the IBM (Chapter 3). In retrospect, the divergent findings might also be attributable to the different eating environments that different researchers have placed participants in after (or during) IBM-exposure (see Table 29). Some, researchers have developed some experimental designs to allow

Table 29
Updated Review of Literature: Restrained Eaters' IBM-related Food Intake

Author	Participants	Restraint Scale	Comparison Stimuli	IBM Stimuli	Presentation of and Attention to IBM	Restrained Eaters' Self-evaluation or Mood in the IBM-condition	Type of Food	Attention to Food	Restrained Eaters' Food Intake in the IBM-condition
Strauss et al. 1994	86 female undergraduates	RS median split	Neutral/no TV commercial Combined for analyses	TV commercials containing thin models and diet products	Commercial breaks (1.5-minutes) within a sad film	Neither anxiety nor sadness were significantly affected	M&Ms and salted peanuts Total grams analysed	Distracted while watching a film Participants were told that they would be asked for their food preferences	Restrained eaters ate significantly more than restrained eaters in the comparison condition, and more than unrestrained eaters in either condition
Seddon & Berry 1996	74 women from a variety of backgrounds (M_{age}: 25.60)	RS median split	Neutral TV commercials Some contained un-stereotypical women	TV commercials containing thin and attractive models	12-minutes of commercials Participants were told not to memorise irrelevant detail, but that they would answer questions about the commercials	Self-esteem was not significantly affected	Salted peanuts, chocolate peanuts, and savoury snacks Total grams analysed	Taste test	Restrained eaters ate significantly more than unrestrained eaters Covariates: self-esteem change score
Mills et al. 2002 (Study 1)	98 female undergraduates (M_{age}: 19.72)	RS median split	Plus-sized model advertisements or neutral advertisements	Magazine advertisements containing thin and attractive models	12 laminated full body advertisements with consumer questions (15-minutes)	Negative affect was not significantly affected Restrained eaters reported higher appearance self-esteem and reported their current body size as smaller	Three flavours of cookies Total grams analysed	Taste test	Restrained eaters ate significantly more than restrained eaters in the comparison conditions ate Simple slopes were not reported
Warren, Strauss et al. 2005 (Study 1)	91 female high-school students	RS median split	Neutral commercials	TV commercials containing thin models and diet products	Commercial breaks (1.5-minutes) within a sad film	Negative mood was not significantly affected	M&Ms and salted peanuts Total grams analysed	Distracted while watching a film Participants were told that they would be asked for their food preferences	Restrained eaters ate significantly more than restrained eaters in the comparison condition, and more than unrestrained eaters in either condition
Monro & Huon 2006	68 female students	RS	Thin model removed from advertisements	Magazine advertisements containing thin models and body products	2-minutes viewing six advertisements—participants memorised the images for a memory test		Sweet and savoury biscuits	Taste test	No significant effect Covariate: age/BMI
Anschutz, van Strien et al. 2008	124 female students (M_{age}: 21.80) (M_{BMI}: 23.30)	DEBQ-R	Neutral commercials	TV commercials containing thin models and diet products	Commercial breaks (3.5-minutes) within a sad or neutral film		M&Ms and crisps Total caloric intake analysed	Distracted while watching a film	Restrained eaters ate significantly less than unrestrained eaters ate Covariates: hunger/overeating
		RS	Neutral commercials		Commercial breaks (3.5-minutes) within a sad or neutral film		M&Ms and crisps Total caloric intake analysed	Distracted while watching a film	No significant effect Covariates: hunger/overeating
Anschutz, Engels et al. 2009	110 female students (M_{age}: 20.05) (M_{BMI}: 22.39)	DEBQ-R median split	Plus-sized model commercials or neutral commercials	TV commercials containing thin models	Commercial breaks within a neutral film	Neither sadness, happiness, nor body-focused anxiety were significantly affected	M&Ms and crisps Total caloric intake analysed	Distracted while watching a film	No significant effect

participants to eat in a mindful manner after IBM-exposure. For instance, participants in Studies 1 and 3 evaluated the food for taste-test purposes. During taste tests, participants are generally required to focus on the sensory characteristics of the food. Research has suggested that such mindful focus either does not significantly affect participants' food consumption (Bellisle & Dalix, 2001; Long, Meyer, Leung, & Wallis, 2011), or facilitates dietary regulation (de Graaf & Kok, 2010; Poothullil, 2002).

In comparison, other researchers have developed experimental designs that encourage more mindless eating. For example, Strauss et al. (1994) had participants consume food while watching IBM-related television. Mindless eating means that one eats without much conscious awareness and without noticing situational eating cues (Wansink, 2006). Research has shown that distracted participants who are eating mindlessly consume a statistically significant 15% more food than nondistracted participants consume (Bellisle & Dalix, 2001; see also Boon, Stroebe, Schut, & Ijntema, 2002; Long et al., 2011).

Important for the current thesis, to self-regulate successfully, unsuccessful restrained eaters (RS) need to self-monitor their food intake (Heatherton, Polivy, Herman, & Baumeister, 1993). Therefore, because distractions (e.g., television) disrupt their self-monitoring, participants who score highly on the RS are especially vulnerable to overeat while distracted (e.g., Boon et al., 2002; Ward & Mann, 2000). However, when identifying restrained eaters with either the EI-R or DEBQ-R—measures of more successful restraint (e.g., Laessle et al., 1989)—restrained and unrestrained eaters do not consume significantly different amounts of food while distracted (Bellisle, Dalix, Airinei, Hercberg, & Peneau, 2009; Bellisle, Dalix, & Slama, 2004; Brunstrom & Mitchell, 2006) .

IBM-attention and eating-attention. Thus, perhaps it is the combination of participants' dietary restraint status, IBM-attention and eating-attention that predicts their food intake. There are four experimental designs that could test the effect of IBM-exposure on participants' food intake manipulating both IBM-attention and eating-attention: distracted

exposure and distracted eating, distracted exposure and attentive eating, attentive exposure and distracted eating or attentive exposure and attentive eating). To date, researchers have not published a study (with dietary restraint status as a potential moderator) in which participants have been encouraged to focus on the IBM-exposure, but eat mindlessly. However, research on the other three scenarios is discussed below.

First, participants could be distracted during IBM-exposure (i.e., inadvertent exposure) and distracted while eating (Anschutz, Engels et al., 2009; Anschutz, van Strien et al 2008; Strauss et al., 1994; Warren, Strauss et al., 2005). As mentioned, unsuccessful (RS), but not successful (DEBQ-R) restrained eaters are likely to overeat while distracted (e.g., Boon et al., 2002; Brunstrom & Mitchell, 2006). Data gathered by other IBM-researchers suggests that inadvertent IBM-exposure magnifies this effect among unsuccessful restrained eaters (Strauss et al., 1994; Warren, Strauss et al., 2005). In comparison, when successful restrained eaters (DEBQ-R) view IBM inadvertently and eat while distracted, they either eat the same amount (Anschutz, Engels et al., 2009) or eat less than other participants eat (Anschutz, van Strien et al., 2008).

Second, participants might be distracted during IBM-exposure, but mindful of their food intake (Study 3 Inadvertent-Attention-condition). In comparison to previous researchers that encouraged inadvertent IBM-attention and mindless eating (e.g., Strauss et al., 1994), the data gathered in Study 3 suggests that, when eating mindfully (e.g., during a taste test), paying inadvertent attention to IBM buffers less successful restrained eaters (RS-CD) from eating. McFerran, Dahl, Fitzsimons, and Morales (2010) found a similar pattern with stimuli of thin women, rather than thin women media images. McFerran et al.'s participants were inadvertently exposed to a very thin or overweight waitress. After the waitress had left the room, participants completed a taste test by themselves. This methodology is similar to the methodology used in Study 3. That is, participants did not intently focus on the thin female stereotype and then subsequently consumed high-calorie food in a mindful environment. Similar to Study 3,

restrained eaters (RS) who saw the thin waitress inhibited their food intake in McFerran et al's study.

Third, the experimental design might encourage IBM-attention and eating attention (Mills et al., 2002; Seddon & Berry, 1996; thesis Study 1; thesis Study 3—Advertent-Attention-condition). Previous researchers have shown that paying advertent attention to IBM causes unsuccessful restrained eaters (RS) to eat significantly more than others even if they are able to focus on eating mindfully (Mills et al., 2002; Seddon & Berry, 1996). Given that mindful eating helps unsuccessful restrained eaters (RS) restrain their eating (e.g., Boon et al., 2002), advertent IBM-exposure appears to supersede this effect. The results of Study 3 are consistent with this contention. Among participants assigned to pay a high amount of attention to IBM, unsuccessful restrained eaters (RS-CD) ate more in the taste test (i.e., mindful eating) than unrestrained eaters ate. The methodology in Study 1 (IBM-attention and eating-attention) was similar to Study 3's. However, the results obtained in Study 1 were inconclusive. Perhaps the results in Study 1 would have been similar to Study 3's if the taste test and experimental primes had been better designed.

Summary

In contrast to the majority of research in this area, across the three experiments conducted for this thesis, there was minimal evidence that being in different experimental prime conditions had significant main effects upon participants. The experimental prime condition variable only affected one of the 21 dependent variables in the main samples. In Study 2 participants in the different conditions reacted differently to the sweet food words in the LDT (approach sample). However, this effect was driven by the comparison conditions. That is, participants in the IBM-condition did not approach sweet food words significantly differently to participants in the other conditions. Therefore, in contrast to sociocultural theories and meta-analytic effect sizes, experimentally induced IBM-exposure did not detrimentally affect women in general. Because of the presence/absence of demand characteristics, my studies differ from past researchers' studies. Although some of these past (non-restraint related) researchers attempted to

control for such confounds (e.g., Hawkins et al., 2004), many others did not (e.g., Birkeland et al., 2005). Because demand characteristics produce inflated negative responses to IBM (Mills et al., 2002), negative effect sizes might have been smaller in past research if more researchers had accounted for these demands.

I was, however, mainly interested in the interaction between participants' restraint status and the experimental prime condition variable. Statistically significant interaction effects predicted negative weight satisfaction and mood among participants in Study 1. However, as in previous research, compared to other participants in the samples, restrained eaters in Studies 2 and 3 did not report significantly different negative effects after paying advertent (e.g., Seddon & Berry, 1996) or inadvertent attention to IBM (e.g., Anschutz, Engels et al., 2009). The inconsistent effects (e.g., Study 1 vs. Studies 2 and 3) could be blamed upon a myriad of variables (e.g., statistical power to detect interaction effects), or on between-study methodological differences. However, perhaps the effect of viewing IBM on restrained eaters' self-evaluation is not robust. In other words, negative effects can occur in one particular setting (e.g., thesis Study 1), and positive effects can occur in other settings (e.g., Mills et al., 2002). Overall though, restrained eaters' self-evaluations do not seem to be strongly influenced by IBM-exposure (thesis Study 2; thesis Study 3). This is consistent with the majority of literature in this area (e.g., Ogden & Mundray, 1996; Seddon & Berry, 1996).

In saying that, it is also acknowledged that restrained eaters might have experienced heightened negative mood after IBM-exposure. However, because restrained eaters might defend against negative IBM-mood effects (Chapter 3), this negative mood might need to be measured implicitly. Unfortunately, implicit mood was not measured in Studies 2 and 3, and previous IBM-researchers have only measured restrained eaters' mood explicitly (e.g., Anschutz, Engels et al., 2009).

The effect of participants' IBM-attention level on the eating-related variables was also more complex than originally hypothesised. However, it is difficult to compare the current

findings with previous research. This difficulty is mainly because the two taste-test designs (Studies 1 and 3) only allowed participants to eat mindfully. In comparison, some previous IBM-eating researchers created more mindless eating environments for their participants.

To conclude, over three well-designed experiments, little of the gathered data were consistent with the hypotheses. This inconsistency was despite incorporating two measures of dietary restraint, implicit and innovative outcome measures, carefully designing the experiments and after controlling for demand characteristics. Perhaps the effects reported within this small literature (restrained eaters' response to viewing IBM) are not robust. Even though a large number of dependent variables were measured and the analyses were checked with and without suspicious and obese participants, few IBM-effects were statistically significant. More research is needed to elucidate the specific environments restrained eaters need to be in for IBM-exposure to affect their self-evaluation, mood and immediate food intake. Likewise, the mechanisms triggering IBM-related (under/over) eating need more attention. In saying that, with the significant data patterns obtained throughout these studies, a preliminary and speculative theory predicting restrained eaters' self-evaluations, mood and eating is outlined below (see Figure 14). This theory draws upon control theory, restraint theory and nonconscious goal pursuit.

Control Theory, Restraint Theory and Nonconscious Goal Pursuit

Before outlining this preliminary theory (Figure 14), it needs to be reinforced that only successful, rather than unsuccessful restrained eaters seem capable of practising dietary restraint in mindless (and mindful) eating environments (Bellisle et al., 2004; Boon et al., 2002). Therefore, unsuccessful restrained eaters' eating is theorised to be environment specific, whereas IBM-exposure is theorised to affect successful restrained eaters' eating behaviour independent of their eating environments.

Advertent IBM-exposure. Advertent IBM-exposure negatively affected unsuccessful and successful restrained eaters' mood in Study 1. Suppose advertent IBM-exposure also affected

Figure 14
Preliminary theory for restrained eaters' IBM-related food intake

Restrained Eater	IBM-Exposure		Eating Environment		Mechanism		Eating-related Outcome	Reference
Unsuccessful (RS or RS-CD)	Advertent	⇨	Mindful	⇨	Negative mood	⇨	Eating	Study 3 Mills et al. (2002) Seddon and Berry (1996)
Unsuccessful (RS or RS-CD)	Advertent	⇨	Mindless	⇨	Negative mood	⇨	Eating	
Successful (DEBQ-R or DIS)	Advertent	⇨	Mindful	⇨	Negative mood	⇨	Tend toward eating, but this had been discouraged	Study 3
Successful (DEBQ-R or DIS)	Advertent	⇨	Mindless	⇨	Negative mood	⇨	Tend toward eating, bit this has been discouraged	
Unsuccessful (RS or RS-CD)	Inadvertent	⇨	Mindful	⇨	Nonconscious goal pursuit	⇨	Dietary restraint	Study 3
Unsuccessful (RS or RS-CD)	Inadvertent	⇨	Mindless	⇨	Nonconscious goal pursuit	⇨	Eating	Strauss et al. (1994) Warren, Strauss et al. (2005)
Successful (DEBQ-R or DIS)	Inadvertent	⇨	Mindful	⇨	Nonconscious goal pursuit	⇨	Tend toward dietary restraint	Study 3
Successful (DEBQ-R or DIS)	Inadvertent	⇨	Mindless	⇨	Nonconscious goal pursuit	⇨	Tend toward dietary restraint	Anschutz, Engels et al. (2009) Anschutz, van Strien et al. (2008)

Note. Negative mood needs to be measured implicitly

their (unmeasured) mood in Studies 2 and 3. As previously speculated, restrained eaters might experience negative mood after advertent IBM-exposure because the upward social comparisons drawn with the thin models reminds restrained eaters of the large discrepancy between their own body size and the models' body size. Control theorists would predict that this goal-related negative affect would assist self-regulation. However, in Study 3, unsuccessful restrained eaters did not regulate their food intake after advertent IBM-exposure (Figure 11). That is, inconsistent with control theory, they ate significantly more than unrestrained eaters who were advertently exposed to IBM.

Although this finding might imply that these unsuccessful restrained eaters did not experience negative mood in Study 3, restrained eaters' level of self-efficacy dictates how negative affect affects dietary regulation. Various researchers have tested control theory and established that goal-threats and/or goal-related negative affect are most likely to assist self-regulation among self-efficacious individuals (e.g., Fishbach et al., 2003; van de Ven et al., 2011). Therefore, participants with low levels of self-efficacy (e.g., unsuccessful restrained eaters) are less likely to use negative affect to self-regulate. Thus, unsuccessful restrained eaters (RS-CD) who were exposed to IBM advertently in Study 3 may still have experienced implicit negative mood even though they ate more than other participants ate (Figure 11). It is noteworthy that participants in Study 3 were placed in a mindful eating environment. In this case, in conjunction with previous research (Mills et al., 2002; Seddon & Berry, 1996), the obtained data patterns imply that the experience of negative affect among unsuccessful restrained eaters might override the self-regulatory effects of mindful eating (Figure 14).

In comparison, participants with higher levels of self-efficacy (e.g., successful restrained eaters) tend to self-regulate while (or after) experiencing negative affect (e.g., Fishbach et al., 2003; van de Ven et al., 2011). Therefore, if, as suggested by the data obtained in Study 1, successful restrained eaters did experience negative mood after advertent IBM-exposure they would not have eaten more than other participants (Figure 14). The data gathered in Study 3

were consistent with this idea. Certainly, successful restrained eaters (DIS) behaved similarly to the unsuccessful restrained eaters (RS-CD) in the Advertent-Attention-condition. That is, successful restrained eaters tended toward eating more than the unrestrained eaters ate (footnote 54, p. 159). However, the effects were not statistically significant. Therefore, compared to less self-efficacious/unsuccessful restrained eaters, self-efficacious/successful restrained eaters seemed to display superior dietary regulation. Perhaps advertent IBM-exposure triggered implicit negative affect, which triggered just enough self-control for successful restrained eaters to resist eating more than other participants.

Inadvertent IBM-exposure. Based upon restraint theory and associated research (e.g., Schotte et al., 1990), unsuccessful restrained eaters (RS) are likely to increase their food consumption when they experience negative affect. Therefore, if unsuccessful restrained eaters (or self-reported dieters) felt negatively after inadvertent IBM-exposure in Study 3, then it is likely that they would have eaten more, rather than less, than others during the taste test. As previously mentioned, instead of producing implicit negative mood, inadvertent IBM-exposure might trigger nonconscious goal pursuit among restrained eaters. However, to practice dietary restraint, unsuccessful (but not necessarily successful) restrained eaters might need to focus on their food intake (Figure 14). For example, in Study 3, participants were able to eat mindfully after inadvertent exposure and consequently, compared to some other participants, unsuccessful restrained eaters restrained their food intake during the taste test (Figure 12). However, when researchers expose participants to IBM inadvertently and place them in an environment that promotes mindless eating, unsuccessful restrained eaters seem to eat more than other participants (Strauss et al., 1994; Warren, Strauss et al., 2005). This same environment does not promote successful restrained eaters' food intake (Anschutz, Engels et al., 2009; Anschutz, van Strien et al., 2008).

Consequently, perhaps Strauss et al.'s (1994) original concept had merit (Chapter 1). To recap, they were the first researchers to investigate the link between IBM-exposure and

unsuccessful restrained eaters' (RS) eating behaviour. Strauss and her colleagues hypothesised that, after a milkshake preload triggered eating, IBM-exposure would prompt successful dieting among restrained eaters (i.e., reinhibition after disinhibition). However, restrained eaters ate more than unrestrained eaters during inadvertent IBM-exposure (commercial breaks during a film). After Study 1, it was proposed that Strauss et al.'s data would have been consistent with reinhibition theory if the IBM-exposure been advertent, rather than inadvertent (Chapter 3). However, the results obtained in Study 3 imply that, indeed, inadvertent IBM-exposure may have fostered reinhibition if such unsuccessful restrained eaters had had the opportunity to focus on their eating.

Applied Implications

The nonsignificant and statistically significant results in this thesis not only have theoretical, but applied implications. Although being in the experimental conditions did not consistently significantly affect participants' self-evaluations or mood, the majority of other IBM-researchers report negative effects. Many media-related interventions have been developed to counter these negative effects. These interventions include media-literacy programs, interventions and warning labels that highlight media modifications (e.g., digital airbrushing), and the movement toward larger fashion and advertising models.

Media-literacy interventions aim to reduce the credibility of media images by encouraging women to view IBM critically. These interventions can be externally or internally orientated (e.g., Irving, Dupen, & Berel, 1998). Within externally orientated interventions women are offered strategies to contest the sociocultural thinness norm (e.g., stop purchasing fashion and beauty magazines, or confront peers who bully others about their weight). In comparison, within internally orientated interventions participants are taught to buffer negative IBM-responses at an internal level. These women are trained to recognise and question unhealthy cognitions (e.g., body dissatisfaction). Although evidence is mixed (e.g., Irving & Berel, 2001), these programs

can reduce participants' tendencies to compare with or internalise the thin-ideal stereotype (e.g., Irving et al., 1998).

Media-modification interventions are similar to media-literacy interventions. Media-modification interventions highlight the digital modifications that IBM-images undergo. As mentioned in Chapter 1, it is common for advertising industries to airbrush (perfect) the models' bodies and faces to appear slim and attractive (National Advisory Group on Body Image, 2009). Within media-modification interventions, consumers are reminded that the images are usually photoshopped and artificial. For example, researchers (e.g., Want, Vickers, & Amos, 2009) expose participants to videos or written scripts that describe the time and preparation that goes into photo shoots (e.g., hair, makeup and lighting), and also the digital modifications each image undergoes before publishing. These interventions buffer participants from reporting negative IBM-effects (Posavac, Posavac, & Weigel, 2001; Quigg & Want, 2011; Want et al., 2009; Yamamiya et al., 2005).

The similar concept of warning labels (or disclaimers) is becoming popular. For example, the Liberal Democratic Party in the United Kingdom has campaigned for warning labels to accompany digitally modified IBM (Pack, 2010). In a recent study Slater, Tiggemann, Firth, and Hawkins (2012) investigated the efficacy of including warning labels with advertent IBM-exposure (magazine fashion spreads). Compared to viewing IBM without warning labels, participants reported significantly lower body dissatisfaction when viewing IBM that was accompanied by either generic warnings (e.g., "these images have been digitally altered", p. 111) or specific warnings (e.g., "these images have been digitally altered to lengthen legs and trim inner thighs", p. 111). However, the research in this new area is mixed. A separate study conducted by the same research group (Tiggemann et al., 2012) did not replicate the main effect obtained by Slater and her colleagues. Tiggemann et al. (2012) used IBM-magazine advertisements instead of fashion spread images. They found that (generic or specific) warning labels did not significantly decrease participants' state social comparison or their body

dissatisfaction and that the specific warnings even increased body dissatisfaction among women with appearance comparison tendencies. Perhaps the results obtained within these two studies differed because IBM-advertisements (vs. fashion spreads) elicit greater levels of social comparisons/dissatisfaction (Tiggemann et al., 2012). Therefore, warning-label research deserves further research attention.

Last, politicians and researchers have also begun advocating for body-size diversity in advertising and fashion images (e.g., Australian Government, 2009). From a marketing perspective, images of attractive average-sized[55] models still effectively sell the advertised product to consumers (Halliwell & Dittmar, 2004), and might be more effective than images of thin models are (Bower, 2001). Furthermore, although mixed (e.g., Anschutz, Engels et al. 2009), research shows that incorporating average-sized models into media imagery fosters positive body image (e.g., Diedrichs & Lee, 2011; Halliwell & Dittmar, 2004)—a relief effect (Dittmar & Howard, 2004).

Within the current set of experiments I found little evidence for negative IBM-effects. However, it was speculated that advertent, and not inadvertent, IBM-exposure triggers negative mood among restrained eaters. This negative mood was theorised to assist successful, but not unsuccessful restrained eaters' self-regulation. Based upon Study 3's results, it has also been theorised that inadvertent, but not advertent, IBM-exposure activates restrained eaters' nonconscious goal pursuit and dietary restraint. Again, it should be reinforced that this theory is preliminary and is based upon a combination of somewhat uncertain results that require testing. Still, in the proceeding discussion I have considered this preliminary theory alongside these four media-related interventions. Because these interventions affect internalisation and negative IBM-effects, they might have some eating-related effects also.

[55] Halliwell and Dittmar (2004) chose average-sized models to correspond to the average-sized UK women (UK/NZ size 14). Using formula (BMI = UK dress size/0.564; Han, Gates, Truscott, & Lean, 2005) size 14 women would have a normal BMI, verging on an overweight BMI (BMI = 24.82).

Although evidence is obviously mixed, all four intervention techniques (e.g., media literacy) might reduce participants' comparison tendencies and internalisation. Therefore, under some circumstances, these techniques might reduce the theorised negative effects associated with concentrating on IBM (e.g., implicit negative mood). Consequently, unsuccessful restrained eaters might be buffered from the eating associated with advertent-IBM-exposure (Figure 14). In saying that, media-literacy and media-modification interventions conjure attentive IBM-exposure. Similarly, Tiggemann et al. (2012) speculated that warning labels might also encourage advertent IBM-attention. Consequently, at least initially, participants' inadvertent attention (and therefore unsuccessful restrained eaters' nonconscious goal-pursuit/restraint) might be eliminated by these techniques. Although this cost might be balanced by the possible benefits (e.g., reduced internalisation and/or negative affect) of media-literacy and media-modification interventions, Tiggemann et al. found that warning labels might not necessarily have such beneficial effects. However, perhaps consumers will habituate to the warning labels after a period of time. In turn, the labels might not automatically elicit advertent attention and therefore images with warnings might still be able to trigger nonconscious goal pursuit via inadvertent attention. However, because advertent exposure to images with specific warnings might be negative for consumers (Tiggemann et al., 2012), more research in this area is necessary. Advertent exposure to average-sized models provides a relief effect (Dittmar & Howard, 2004), and might therefore buffer unsuccessful restrained eaters' IBM-related eating. However, fleeting glances at average-sized models (vs. IBM) might be less likely to trigger restrained eaters' goal pursuit and dietary restraint. This speculation is in line with lay perceptions that average-sized models would not provide health-related inspiration for consumers (Diedrichs, Lee, & Kelly, 2011) and may even contribute to the obesity epidemic (Wells, 2010).

However, as Diedrichs et al. (2011) noted, there is no empirical evidence for these lay perceptions. Inadvertent exposure to average-sized (vs. underweight) models might still trigger dietary restraint. For instance, it is likely that viewing IBM activates restrained eaters' dietary

goals because the models have smaller bodies than the participants have. Therefore, if average-sized models have a BMI within the normal range (NZ/UK dress size 11-14) then they would still be smaller than the majority of Western women (Flegal, 2005). Consequently, inadvertent exposure to average-sized models should still trigger nonconscious goal pursuit and dietary restraint. Future researchers need to test these assumptions. If average-sized models did trigger goal pursuit and restraint, then such media exposure (inadvertent or advertent) would not harm restrained eaters' eating. Obviously, this argument would be different if the models were plus-sized overweight models rather than normal-weight models. However, an overwhelming presence of overweight, rather than normal-weight, media models is unlikely given the barriers that body-size campaigners face from marketers and advertisers (e.g., Gillian, 2000).

Summary. Unlike the majority of IBM-researchers, I did not find overwhelming evidence for negative IBM-effects. However, it was theorised that restrained eaters were experiencing (unmeasured) implicit negative mood after advertent IBM-exposure. These media-related interventions warrant further investigation. Namely, future researchers need to test participants' dietary restraint status as a moderator and assess participants' eating behaviour and eating environment (mindful vs. mindless) in response to these intervention techniques.

Strengths, Limitations and Future Research Directions

These studies were limited in some ways. However, there were also a number of strengths.

Strengths. The studies were notably strengthened by the focus I placed upon measuring participants' dietary restraint status as a potential moderating variable and the use of two different restraint scales to identify restrained eaters. Additionally, the attention given to reducing demand characteristics was also a strength.

Dietary restraint status. As mentioned at the beginning of the discussion, previous researchers highlighted the need to look at moderating variables within this literature (e.g., Hargreaves & Tiggemann, 2002). Although it seems logical that viewing IBM would affect

restrained eaters differently to unrestrained eaters, this literature is rather small. While the current results do not conclusively determine how restrained eaters are affected, the results do extend the literature and present new avenues of investigation. For example, in some circumstances IBM-exposure does seem to significantly affect restrained eaters' goals and immediate dietary restraint. It is not yet clear how and why, but combining the current results with the results reported by previous researchers, IBM-exposure appears to have some bearing.

The current experiments were also strengthened by using two, rather than one restraint scale. Evidently, the literature surrounding restraint measurement is convoluted. This complexity meant that the pre-existing small literature on IBM and restrained eaters was inconsistent. It was initially suspected that restrained eaters' food intake would notably differ depending on the restraint scale used to identify them. However, although requiring replication, the current results suggest that restrained eaters' IBM-related food intake may not be as dramatically influenced by the researchers' choice of restraint scale as was first suspected. In saying that, the (LDT and taste-test) effects obtained were only statistically significant for unsuccessful (RS-CD), rather than successful (DIS) restrained eaters. Therefore, future researchers should still be aware of this potential confound.

Furthermore, unlike many other IBM-studies, in Studies 2 and 3 I investigated how IBM-exposure might affect self-reported dieters' self-evaluations, food intake and goals. The obtained data patterns implied that dieters were affected by inadvertent exposure differently from advertent exposure. Consequently studying self-reported dieters (as well as restrained eaters) is an area that warrants further study.

Demand characteristics. Previously, Mills et al. (2002) stressed that: "…it is imperative for research in this area to consider the balance between a powerful manipulation and the minimisation of demand characteristics…" (p. 1697). To recap, demand characteristics exist when participants become conscious of the research objective and adjust their responses. My three experiments were designed to be minimally affected by demand characteristics. Compared

to previous research, this design is a strength of the studies, and as previously mentioned, may account for the lack of negative effects obtained.

First, considerable care went into developing plausible cover stories that separated the IBM-exposure from the measurement of the dependent variables (e.g., food consumption) in Studies 1 and 3. Second, prior to data analyses, data obtained from participants who connected the experimental manipulation to the dependent variables or were suspicious of the connection were not included in the main data analyses. Although this strict inclusion criteria triggered some detrimental side effects (e.g., uneven condition sample sizes), this criterion increased each study's validity.

Last, where appropriate, implicit outcome measures were incorporated (e.g., joystick LDT). Because self-control has implicit links (e.g., Fishbach et al., 2003), the joystick LDT was an innovative way to minimise demand characteristics and measure participants' approach and avoidance tendencies. Previously the joystick LDTs' limitations have been a focus. However, although the LDT-effects obtained in Study 2 did not replicate in Study 3, it may be worth refining or developing a task similar to the joystick LDT for future research purposes.

Implicit measures of mood and self-esteem were also included. Because these measures were implicit, participants were unlikely to connect these variables to the studies' purposes. Furthermore, implicit measures have been lacking in previous IBM-literature. This limitation is especially evident within the small literature about restrained eaters. As previously mentioned, because restrained eaters may psychologically defend against negative IBM-effects, it may be especially important to measure restrained eaters' IBM-responses implicitly. This is because such defences would likely affect explicit, but not implicit outcome measures. This measurement distinction is reinforced by researchers finding implicit (thesis Study 1), but not explicit negative mood (e.g., Anschutz, Engels et al., 2009) effects among restrained eaters.

Limitations and future research directions. Areas for future research have been emphasised throughout this thesis. For example, I suggested that IBM-researchers should re-

design the current taste-test paradigm (e.g., manipulate food-related attention and/or food variety) and investigate hypotheses similar to my own within samples of highly restrained or problem eaters. Additionally, the current studies contained a number of limitations that deserve attention. While discussing such limitations, avenues for future research are highlighted.

Measurement. The current studies were limited by some of the measures. First, the joystick LDT provided inconsistent data. It is possible that restrained eaters in Study 2 may have either been avoiding the diet words, or responding to the diet words faster than other participants. Still, because Study 2's results were not replicated in Study 3, the statistically significant LDT results in Study 2 may have been a fluke. Because null results are less publishable, it is hard to know if previous researchers have also struggled with this outcome measure.

Second, not related to the LDT, in Studies 1 and 2, but not in Study 3, the two restraint scales (DIS and RS-CD) were separated by other scales. Additionally, in Study 1 participants completed the DIS pre-manipulation (2-weeks prior) and the RS-CD post-manipulation, in Study 2 both the DIS and the RS-CD were completed post-manipulation, and in Study 3 both scales were completed pre-manipulation (2-weeks prior). Ideally, all of the self-report scales should have been presented to all of the participants in the same order. Both restraint scales demonstrate high test-retest reliability, should be stable over time and not be influenced by order effects (e.g., Allison et al., 1992; Klesges et al., 1991; Stice, 1998). However, it remains possible that participants' restraint scores were influenced by the preceding manipulation and/or measures.

Last, the statistically significant interaction effects only accounted for small amounts of additional variance in participants' IBM-responses. Interaction effects can be difficult to detect (Morris et al., 1986). However, power analyses suggested that each study had adequate power to find medium-sized interaction effects if they were present. It is also noteworthy that—in addition to the variance accounted for by the whole model—some interaction effects accounted

for up to 10% additional variance in the dependent variable (Study 1: experimental prime condition variable x DIS variable = implicit mood), whereas others only accounted for 2% (Study 2: experimental prime condition variable x RS-CD variable = LDT-sweet food words). Although small increments in R^2 are notable (Cohen, 1992), future researchers might consider other outcome variables or measures that explain more of the remaining variance.

Attrition. On the one hand, demand characteristics were better controlled for in Studies 1 and 3 than in Study 2. On the other hand, Studies 1 and 3 suffered from attrition because of the pre-test/post-test designs. I used pre-test questionnaires to gather pre-manipulation measurements (e.g., weight satisfaction) and to boost the cover stories with filler items. As previously outlined, in Study 1, weight-dissatisfied participants were less likely to progress beyond the pre-test questionnaire (Phase 1 of 3). Consequently, the final sample in Study 1 was probably more satisfied with their weight than the average university-aged population was. However, participants were randomly assigned to an experimental condition in the main study in the laboratory (Phase 2), and participants in different experimental conditions did not differ by weight satisfaction.

The pre-test questionnaire that I developed for Study 1 contained a large number of eating-related questions (e.g., the eating expectancy questionnaire). It is possible that these questions made weight-dissatisfied participants anxious about Phase 2 of the study. Therefore, I redesigned the pre-test questionnaire for Study 3. First, the majority of items in Study 3's pre-test questionnaire were fillers (e.g., human senses). Second, apart from the restraint scales, only three items (pre-manipulation measure of weight satisfaction and high-calorie cravings/likings) referred to participants' weight or eating behaviours. Like Study 1, some participants in Study 3 did not progress past Phase 1. However, such participants did not differ significantly from those who completed the study. That is, both groups of participants reported similar age, restraint scores, pre-manipulation weight satisfaction and self-esteem.

In addition to this natural attrition, in all three studies a large number of data were lost due to strict inclusion criteria. As well as suspicious participants, for previously justified reasons, data obtained from obese participants and middle-aged participants were not included in the main analyses. Although IBM is particularly stigmatising for obese women (Greenberg, Eastin, Hofshire, Lachlan, & Brownell, 2003), this group has received little attention in the IBM-related literature. Similarly, like the current sample, participants in this literature are usually young university women. Although older women may be less affected by viewing IBM (Bedford & Johnson, 2006), they still deserve research attention. Albeit data obtained from these two groups of women were purposely excluded from the main analyses, future researchers should investigate how IBM-exposure affects older and/or obese women's self-evaluations, mood and eating behaviour.

Sample characteristics. All three samples were drawn from the University population and were predominately Psychology students. Although King et al. (2004) found that Psychology students did not score significantly differently to other students on a variety of developmental and psychosocial measures (e.g., depression), my ability to generalise findings to other populations of women is still limited. For example, conclusions cannot be drawn about women outside of the University or about older women. However, the university-aged samples within the current studies were similar in age to the population who are most vulnerable to body-image and eating concerns (Tiggemann & Lynch, 2001). As mentioned earlier, it is also a limitation that highly restrained eaters were underrepresented in the current set of studies. Future researchers need to investigate if viewing IBM affects highly restrained, rather than moderately restrained eaters in the hypothesised way. Perhaps it is this minority of women (extreme scorers or problem eaters) who are most notably harmed by viewing IBM.

It is also important to acknowledge that, in comparison to New Zealand census data (Statistics New Zealand, 2006) minority women (e.g., Pasifika women) and women with low socioeconomic and education levels were not well represented in the current samples. This lack

of representation is a downside of sampling a convenient population of educated women, i.e., young European university students. Future researchers should consider replicating the current experiments outside of the university setting.

Experimental manipulation. Throughout this thesis (Studies 1 and 3), participants' food intake has not been described as disinhibited or inhibited. Similarly, participants' behaviour has rarely been referred to as overeating. Although, some IBM-researchers have used these terms (e.g., Mills et al., 2002), the term 'food intake' is not synonymous with 'disinhibited food intake' or 'overeating'. Monro and Huon (2006) argued that researchers should not comment on disinhibited or inhibited food intake unless they have an appropriate comparison condition. Future researchers might also incorporate a taste-test only condition (Monro & Huon, 2006). In other words, how might restrained eaters have behaved had there been no experimental manipulation? This additional condition could clarify restrained eaters' (inhibited or disinhibited) eating behaviour after IBM-exposure and should be incorporated in future research designs.

Second, also related to the experimental manipulation, future researchers might investigate different IBM-stimuli. For example, it is noteworthy that some have included IBM-stimuli with (e.g., Strauss et al., 1994) and without (e.g., Seddon & Berry, 1996) diet products. As can be seen in Tables 1 and 29, unsuccessful restrained eaters (RS) eat more than others eat regardless of whether or not the IBM-images are coupled with diet products (e.g., Mills et al., 2002; Strauss et al., 1994). However, diet-product placement may have contributed to the different results Anschutz and her colleagues obtained when successful restrained eaters (DEBQ-R) were presented with IBM-images coupled with (Anschutz, van Strien et al., 2008) and without (Anschutz, Engels et al., 2009) diet products. Future IBM-researchers would benefit from systematically manipulating the presence/absence of diet products.

Also related to IBM-stimuli, it is possible that viewing televised IBM is more influential than viewing static IBM-images taken from magazines (Hobbs, Broder, Pope, & Rowe, 2006; Nabi, Stitt, Halford, & Finnerty, 2006). However, inspection of the studies in Tables 1 and 29

suggests that different mediums do not systematically affect restrained eaters' IBM-related food intake (e.g., Mills et al., 2002; Seddon & Berry, 1996). However, in line with previously reviewed research, this variable (IBM-medium) would be confounded with mindful/mindless eating. Typically, researchers that employ televised (vs. static) IBM-images measure participants food intake in mindless (vs. mindful) environments. Future researchers need to methodically investigate the relationship between static and televised media images, while keeping participants' eating environments constant.

Artificial environment. The three experimental designs meant that internal validity was strong. However, some experimental situations can be artificial. For example, taste-test scenarios are uncommon outside of research laboratories. In addition, dedicated restrained eaters possibly avoid situations with vast arrays of tempting foods. Consequently, some academics (e.g., Stice et al., 2001; Top, 1991) criticise experimental settings for being artificial representations of the real world. However, Lucas (2003) argued that observing behaviour in experimental settings is no less real than observing behaviour in natural settings. In other words, participants are not faking their behaviour or having fake experiences. Nevertheless, the priority that I gave to internal validity limits the external validity of my studies. It is speculative how participants' IBM-responses would occur in their natural environments. Therefore, although, the experimental design allowed for the testing and development of theories, future researchers should investigate whether or not the results replicate in "real-world" settings.

Real-world application. Obviously, the eating-related patterns in Study 3 would need replication in the laboratory before generalising them to, and testing them in more natural settings. If replicable, it is interesting that researchers have demonstrated the effectiveness of planting subtle dieting cues (i.e., inadvertent attention) in the immediate environment (e.g., Papies et al., 2008; Stroebe et al., 2008). Combining this past research with the current research, future researchers might investigate the strategic placement of IBM in areas that afford subtle and fleeting attention. For example, an image of a thin woman on the inside of a cupboard door

might encourage only fleeting, rather than advertent attention. If restrained eaters had mastered mindful eating, then this placement might generate nonconscious goal pursuit and dietary restraint.

This principle should also apply to IBM that participants encounter outside of their immediate environments (e.g., when out shopping). Similarly, future researchers might encourage unsuccessful restrained eaters to glance at, rather than study IBM in such situations. Interventions might adapt existing behaviour-change techniques to restructure this IBM-processing style. Recently, Papies and Nicolaije (2012) suggested tailoring implementation intentions to modify participants' IBM-responses. Implementation intentions are specific 'if-then' plans that successfully modify behaviours (Gollwitzer, 1999). For example, restrained eaters might form a plan: *If* I notice an advertisement with a thin woman in it, *then* I will glance at it briefly and then turn away and think about *x*. However, unless the participant was a mindful eater, this implementation intention might be fruitless.

Long-term impacts. The long-term impacts of regular IBM-exposure are also unclear. Some researchers note that the negative effects associated with short-term exposure could be cumulative (e.g., Halliwell & Dittmar, 2004). However, not all academics agree with Halliwell and Dittmar's (2004) speculation (e.g., Holmstrom, 2004). Indeed, data obtained in Stice et al.'s (2001) longitudinal experiment (Chapter 1) suggests that this cumulative negative effect might only apply to vulnerable subsets of women. Stice et al. assigned participants to receive and view a 15-month IBM-magazine subscription or not to receive a magazine subscription. Viewing the IBM-magazines led body-dissatisfied women or women who felt particularly pressured to be thin (baseline measures) to report increased negative affect at 15-month follow up. These vulnerability factors did not significantly influence participants' 15-month body dissatisfaction, dieting or bulimic symptoms. Second, participants with poor baseline support networks who received the IBM-subscription reported a significant increase in dieting behaviours as measured with the DEBQ-R (but not in negative affect, body dissatisfaction or bulimic symptoms).

As found in the cross-sectional analyses (Chapter 2), on average restrained eaters are weight dissatisfied and, therefore, likely feel some pressure to be thinner. Consequently, they might be vulnerable to experience long lasting negative affect in response to IBM-exposure (Stice et al., 2001). In turn, this negative affect might trigger eating among unsuccessful restrained eaters. However, this hypothesised connection (IBM-related negative affect and eating) might only be short lived. This connection requires future research attention. Because the quality of restrained eaters' support networks is unknown, considering Stice et al.'s (2001) results, it is less clear how long-term IBM-exposure might affect restrained eaters' eating behaviours (e.g., dieting).

Although baseline weight dissatisfaction and pressure to be thin (i.e., vulnerability factors possessed by restrained eaters) did not relate to increased dieting behaviours in Stice et al.'s study, there may be other unmeasured vulnerability factors. Future researchers might repeat Stice et al.'s (2001) methodology, but assess participants' restraint status (DIS or RS-CD) at baseline. In other words, perhaps restraint status is its own vulnerability factor. Additionally, researchers might repeat Stice et al.'s methodology while manipulating or observing participants' IBM-attention levels. Perhaps viewing the 15-month magazine subscription would only negatively affect restrained eaters if they, purposely (i.e., manipulated) or naturally, focused on the images.

Summary. Although, the current studies contained limitations, they also were well designed and novel. Furthermore, future researchers can learn from the limitations that I have highlighted within my studies. As demonstrated throughout this thesis, an important part of the experimental design process involves acknowledging and rectifying limitations within previous research. It is through this process that meaningful data are gathered and theories can be more precisely tested. Therefore, the current limitations might instead be viewed as building blocks.

Conclusion

In this thesis I aimed to elucidate how and why restrained eaters were affected by viewing IBM. The majority of my findings (significant and nonsignificant) were not entirely consistent

with the hypotheses formulated. That is, restrained eaters only reported statistically significant effects under some specific circumstances.

Based upon my experiments and the small pre-existing literature, I developed a preliminary theory. This theory drew upon components of control theory, restraint theory and nonconscious goal pursuit. I theorised that (via nonconscious goal pursuit) inadvertent IBM-exposure triggers unsuccessful (but not necessarily successful) restrained eaters to eat more than others, unless in a mindful eating environment. In comparison, I theorised that, regardless of their eating environment, advertent IBM-exposure triggers unsuccessful (but not necessarily successful) restrained eaters' eating via implicit negative mood.

Drawing upon this preliminary theory, I discussed applied implications in the context of four media-related interventions: media-literacy, media-modification, warning labels and average-sized media models. The first three aforementioned techniques conjure advertent IBM-exposure, which is theorised to trigger eating among unsuccessful restrained eaters. In comparison, employment of average-sized fashion and advertising models were theorised to be the better intervention technique for unsuccessful restrained eaters. That is, advertent attention to average-sized media models would provide a relief effect and inadvertent attention would trigger nonconscious goal pursuit.

Pooling my experimental results with pre-existing research (Tables 1 and 29), it is clear that there are a myriad of variables that might influence restrained eaters' eating behaviour after or during IBM-exposure. As mentioned, it is possible that the statistically significant effects reported within the literature about restrained eaters' response to IBM-exposure are not robust. However, this literature is small and it is difficult to determine meaningful patterns from a small array of studies that contain different experimental designs and measures. Upon future research being executed, a clearer pattern of behaviour may become evident. For now, with the three experiments conducted for this thesis I have highlighted the importance of restraint status measurement, controlling for demand characteristics (e.g., two-study pre-text and implicit

outcome measures), IBM-related attention and the laboratory-based eating environment created by the researcher. The data obtained from these experiments provides important building blocks for future researchers to investigate and understand how viewing IBM affects restrained eaters.

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Appendix A: Dietary Intent Scale[56]

Using the scale provided below, please indicate your eating behaviours in the last **6 months** (please circle):

		Never ↓				**Always** ↓
1	I take small helpings in an effort to control my weight.	1	2	3	4	5
2	I hold back at meals in an attempt to prevent weight gain.	1	2	3	4	5
3	I limit the amount of food I eat in an effort to control my weight.	1	2	3	4	5
4	I sometimes avoid eating in an attempt to control my weight.	1	2	3	4	5
5	I skip meals in an effort to control my weight.	1	2	3	4	5
6	I sometimes eat only one or two meals a day to try to limit my weight.	1	2	3	4	5
7	I eat diet foods in an effort to control my weight.	1	2	3	4	5
8	I count calories to try to prevent weight gain.	1	2	3	4	5
9	I eat low-calorie foods in an effort to avoid weight gain.	1	2	3	4	5

[56] Reproduced with permission (E. Stice, personal communication, October 17, 2012).

Appendix B: Restraint Scale-concern for dieting subscale[57]

1	How often are you dieting?	O	never
		O	rarely
		O	sometimes
		O	often
		O	always
2	Do you have feelings of guilt after overeating?	O	never
		O	rarely
		O	often
		O	always
3	Do you eat sensibly in front of others and splurge alone?	O	never
		O	rarely
		O	often
		O	always
4	Do you give too much time and thought to food?	O	never
		O	rarely
		O	often
		O	always
5	Would a weight fluctuation of 2.5. kilograms affect the way you live your life?	O	not at all
		O	slightly
		O	moderately
		O	very much
6	How conscious are you of what you are eating?	O	not at all
		O	slightly
		O	moderately
		O	extremely

[57] Reproduced with permission (J. Polivy, personal communication, October 17, 2012).

Appendix C: Study 1 Human Ethics Approval

Ref: HEC 2008/80

5 August 2008

Ms Jessica Boyce
Department of Psychology
UNIVERSITY OF CANTERBURY

Dear Jessica

The Human Ethics Committee advises that your research proposal "The Effects of ideal body media on Self-evaluation, body-satisfaction and mood" has been considered and approved.

Please note that this approval is subject to the incorporation of the amendments you have provided in your email of 1 August 2008.

Best wishes for your project.

Yours sincerely

Dr Michael Grimshaw
Chair, Human Ethics Committee

Appendix D: Study 1 Phase 1 Information Sheet

Department of Psychology

The project is being carried out as a requirement of Jessica Boyce's PhD Thesis under the supervision of Dr. Roeline Kuijer, who can be contacted at 03 3642987 x. 3401. Roeline or Jessica (jab163@student.canterbury.ac.nz) will be pleased to discuss any concerns you may have about participation in the project or about this online questionnaire. The project has been reviewed and approved by the University of Canterbury Human Ethics Committee.

As you are aware, this study will be investigating how different levels of hunger can affect the memory and concentration abilities of female students. Your involvement in this project will consist of two phases, 1) a pre-test questionnaire assessing a number of individual difference variables (you will complete this online), 2) completing some additional measures of hunger and concentration in person.

Before you participate in phase 2 we require you to complete the following pre-test measures (phase 1). Most of these measures are interested in your general attitudes toward hunger, food, weight-issues and eating behaviours. Some measures are also included to assess your general personality, investigating what kind of person you are. In addition, others will investigate your memory and concentration capabilities.

To ensure your confidentiality, the personal details that you provide on this page of the questionnaire will be stored separately from this questionnaire (phase 1) and the subsequent data you will provide in phase 2. You may withdraw your participation at any time. This online questionnaire is expected to take around 10-15 minutes to complete.

Please answer all of the questions according to the instructions. If you are unsure about how to answer, please give the best answer you can. There are no 'correct' or 'incorrect' answers: We are interested in how you feel and what you think. Do not take too long over your replies; your immediate reaction to each question will probably be more accurate than a long thought-out response.

Please note: PSYC 106 students will be reimbursed for their time with course credit (unless otherwise arranged) and non-PSYC 106 students will receive a $10 voucher for their time. To receive this reimbursement all participants need to participate in both phases 1 and 2. Phase 1 will be completed online at least one week prior to your participation in part 2 (in an organized lab session). You will not be reimbursed if you only complete the online questionnaire (phase 1). You must also complete phase 2 in person.

PSYC 106 students will be able to arrange an appointment (to participate in phase 2) via the participant pool webpage once they have submitted their questionnaire. All other students (non PSYC 106) will be contacted via email once they have submitted their questionnaire to arrange a suitable time to participate in phase 2. Your participation is very much appreciated. Before completing the questionnaire please fill out the consent form below.

Yours sincerely, Jessica Boyce and Dr. Roeline Kuijer

CONSENT FORM: The Effects of Hunger on Memory and Concentration (phase 1 of 2)

I have read and understood the description of the above-named study. On this basis I agree to participate, and I consent to the publication of the results of this study with the understanding that confidentiality will be preserved. I understand also that I may at any time withdraw from the study, including withdrawal of any information that I have provided.

Name, Date and Signature:

Appendix E: Study 1 Phase 2 Information Sheet

Information Sheet

Department of Psychology

INFORMATION
You are invited to participate as a subject in the research project 'The Effects of Hunger on Memory and Concentration.'

The aim of this project to is understand how different levels of hunger can influence the attention that female students pay to details, their capability to concentrate and their ability to remember specific details. We are also interested in how this may be related to certain individual difference variables, such as the attitudes you hold toward your body and toward eating. Your involvement in this project will consist of completing a pre-test questionnaire assessing the individual difference variables (you have already completed this part online). In this second and final phase of your participation you will complete some additional measures of hunger and concentration, study a set of images for a few minutes before completing a memory test about them, and complete another short questionnaire relating to your personality.

In addition to your participation in this study, my supervisor (Dr. Roeline Kuijer) requires participants for a study unrelated to my own. I am the research assistant for this unrelated study, 'Individual Differences, Body Perceptions and Taste Perceptions'. This study is unrelated to the study you are taking part in on 'Memory and Concentration' but your assistance would be greatly appreciated, participation will be relatively short. You will be reimbursed for this time with an Instant Kiwi Scratch & Win. Participation involves completing a few additional scales (including a brief taste test) and (if you agree) will be incorporated into today's session.

Participation in both studies is voluntary and you have the right to withdraw from either project at any time, including withdrawal of any information provided.

The results of either project may be published, but you may be assured of the complete confidentiality of data gathered in these investigations: the identity of participants will not be made public without their consent. To ensure anonymity and confidentiality, you will be assigned two different identification numbers (a separate one for each study) and your name will not be associated with your data in any way.

The main project (Hunger & Memory) is being carried out as a requirement of Jessica Boyce's PhD Thesis under the supervision of Dr. Roeline Kuijer, who can be contacted at 03 3642987 x. 3401. Roeline or Jessica (jab163@student.canterbury.ac.nz) will be pleased to discuss any concerns you may have about participation in the project.

The project has been reviewed and approved by the University of Canterbury Human Ethics Committee.

Consent

I have read and understood the description of the project. On this basis I agree to participate as a subject in Jessica's study on 'The Effects of Hunger on Memory and Concentration'. I consent to the publication of the results with the understanding that confidentiality will be preserved.

I understand also that I may at any time withdraw from this project, including withdrawal of any information I have provided. I note that this project has been reviewed and approved by the University of Canterbury Human Ethics Committee.

NAME (please print): …….. Date:
Signature:

Appendix F: Study 1 Phase 3 Information Sheet

Information Sheet

Department of Psychology

INFORMATION
You are invited to participate as a subject in the research project 'Individual Differences, Body Perceptions and Taste Perceptions.'

The aim of this project is to investigate whether certain people are more inclined to prefer subtle differences in texture between certain types of foods, and whether this affects how much they enjoy the food. This study is also interested in how taste perception is influenced by one's attitude toward their appearance and toward themselves. Therefore, in addition to the taste test, you will also complete a short group of questions for this study.

Although your participation in this study is voluntary, your participation will be brief and we would appreciate your assistance. You will be reimbursed for this time with an Instant Kiwi Scratch & Win. You have the right to withdraw from this project at any time, including withdrawal of any information provided.

The results of the project may be published, but you can be assured of the complete confidentiality of data gathered in this investigation; the identity of participants will not be made public without their consent. To ensure anonymity and confidentiality, you will be assigned a five-digit identification number and your name will not be associated with your data in any way.

The project is being carried out by Dr. Roeline Kuijer, (Senior Lecturer in the Psychology Department) who can be contacted at 03 3642987 x. 3401. Roeline or her research assistant Jessica (jab163@student.canterbury.ac.nz) will be pleased to discuss any concerns you may have about participation in the project.

The project has been reviewed and approved by the University of Canterbury Human Ethics Committee.

Consent: Individual Differences, Body Perceptions and Taste Perceptions.

I have read and understood the description of the project. On this basis I agree to participate as a subject in the above named study. I consent to the publication of the results with the understanding that confidentiality will be preserved.

I understand also that I may at any time withdraw from this project, including withdrawal of any information I have provided.

I note that this study has been reviewed and approved by the University of Canterbury Human Ethics Committee.

NAME (please print): …….. Date:
Signature:

Appendix G: Study 1 Debriefing Sheet

Debriefing Sheet

Thank you for taking your time to participate in the study entitled 'The Effects of Hunger on Memory and Concentration', and the study on 'Individual Differences, Body Perceptions and Taste Perceptions'. You were previously informed that the two above mentioned studies were unrelated to one another; in reality they were both part of one study for Jessica's PhD research. To ensure that the experiment that you participated in remained experimentally valid, all participants were unaware that the two studies were related. We would now like to take the time to fully debrief you upon the nature of your participation and what we were actually investigating.

Once again, we thank you for taking your time to participate in this study and we apologize if our deception has caused you any offence. You were previously informed that you had been invited to participate in a study investigating the effect that hunger can have upon memory and concentration. In fact the study that you took part in was not interested in this topic (i.e., hunger and memory), but was interested in the effect that images of thin and attractive women had upon your body satisfaction, mood and eating behaviour.

You were randomly assigned to one of two conditions, in which you were asked to study a set of seven images. You may have been exposed to either, 1) thin images of models advertising certain products or, 2) our control condition, images of just the products (this served as a comparison condition). Although we gave you the impression that this was to investigate how well you remembered specific details of the materials, we were actually interested in how this exposure affected your subsequent eating behaviour (i.e., consumption of the M&Ms) and your mood and body satisfaction.

Briefly, we are interested in whether (in comparison with condition 2) those participants in condition 1 score differently on the variables that we measured (i.e., eating behaviour, mood, and body satisfaction). Currently research in this area is mixed. While some researchers believe that exposing women to images of thin women will negatively affect their body satisfaction and their eating behaviour (e.g., overeating), other research has demonstrated that exposure to thin women will actually enhance their body satisfaction (serving as inspiration), but still negatively affect their eating behaviours.

You were led to believe that the study you took part in on 'Individual Differences, Body Perceptions and Taste Perceptions' was unrelated to the study we required you to participate in. In fact this study contained the main measures of interest for our study (actual eating behaviour, and body satisfaction) and was directly associated with the materials that you were provided with in the step previous to this one (i.e., the images). We apologise for this degree of deception, but assure you that we would not have included such deception unless it was entirely necessary for the purpose of our research. Evidence suggests that if the participants are aware that these measures are associated with exposing them to images of thin and attractive women then they will respond in a different 'socially desirable' manner. Therefore, deception was employed to avoid this confounding variable that would make our findings illegitimate.

The level of deception used in this study was necessary to avoid priming you upon the nature of our study. If this has caused you any distress, or after this debriefing you are concerned about weight/body image issues and/or you would like advice with respect to changing health behaviours, we suggest that you make contact with one of the following services: your General Practitioner, phone the Healthline (0800-611 116) for advice, or contact Student Health & Counseling 03) 364 2402.

I would like to remind you that you have the right to withdraw from the study at any time, including withdrawal of any information provided.

Sincerely
Jessica Boyce (PhD student) and Dr. Roeline Kuijer (Primary Supervisor)

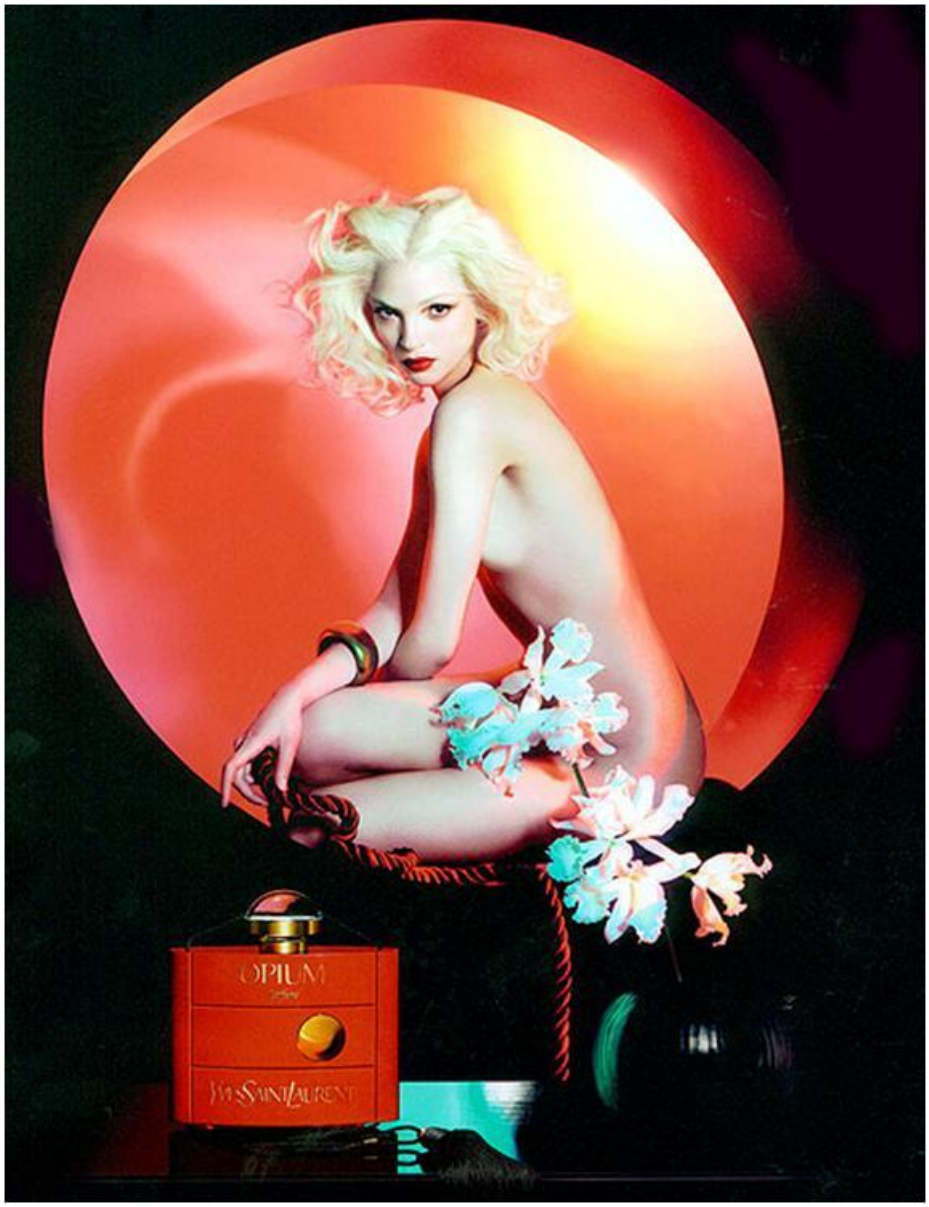
P.T.O

Important: I have not completed running this study, so please do not talk about the underlying aim of this study to other students/possible participants (i.e., that the two studies are actually related, and that we are interested in how women are affected by images of thin and attractive women). If you do, you will endanger the merits of this study.

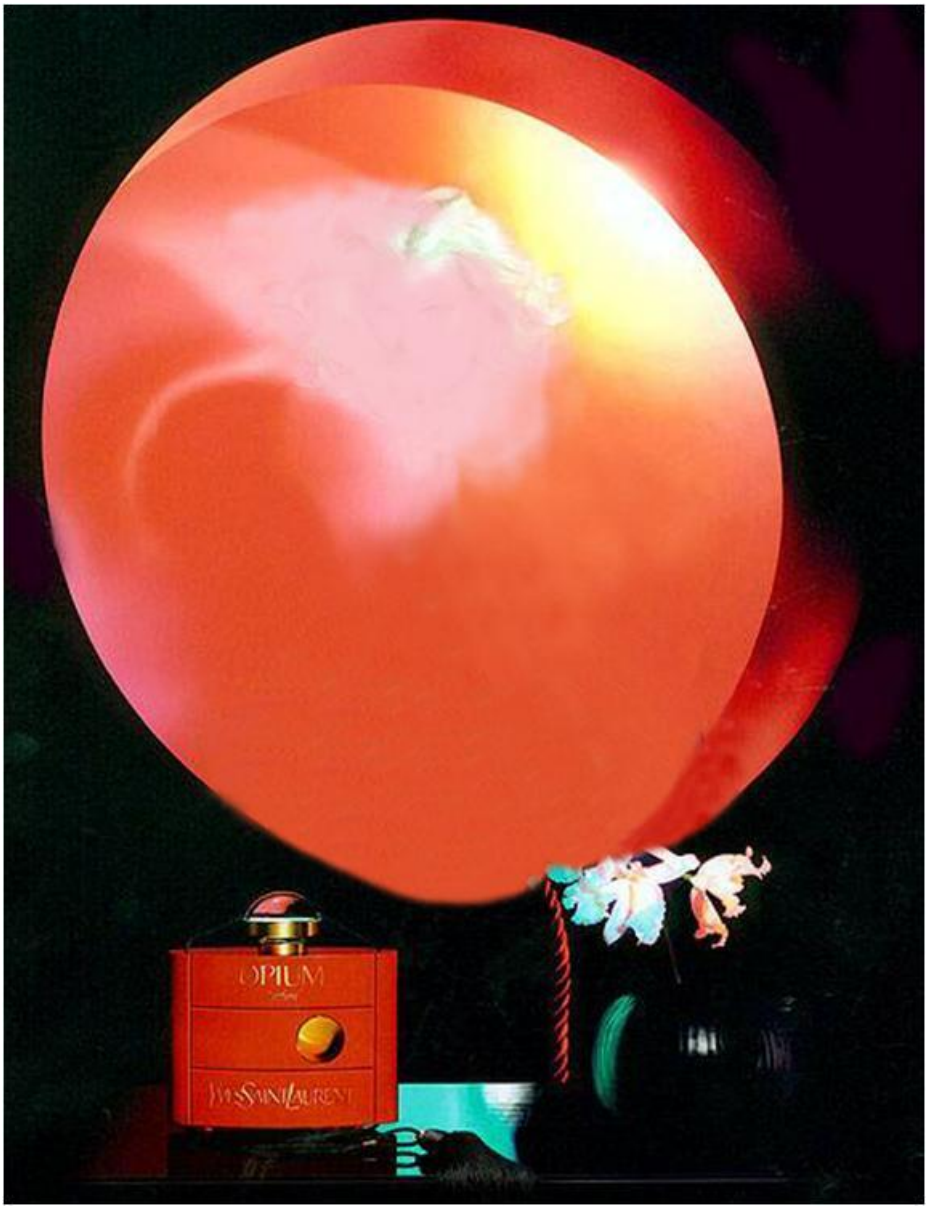
Unfortunately, I cannot allow you to take this debriefing sheet away with you. However, Jessica (jab163@student.canterbury.ac.nz), or her supervisor Dr. Roeline Kuijer (03 364 2987 x. 3401, roeline.kuijer@canterbury.ac.nz) will be happy to answer any of your questions relating to your participation.

Once again, thank you for your participation.

Appendix H: Example Stimuli IBM-condition



Appendix I: Example Stimuli Control-condition



Appendix J: Instructions for Slideshow (Experimental Manipulation)

Memory Exercise 2

You will now watch a short slideshow presentation and participate in another memory exercise.

The slideshow will contain a set of seven images. You will be given approximately 2 minutes to watch the slideshow. Please try your best to concentrate on all the seven images and please make your best attempt to remember specific details about each image.

To assess how your current level of (previously reported) hunger may affect your concentration, after 2 minutes the experimenter will provide you with a brief memory recall test. The test will ask you specific questions about all seven images, so pay equal attention to all seven.

Each image will be displayed for 20 seconds. The power point presentation has been timed so that you do not need to control the presentation, in other words the slides will automatically change after 20 seconds.

When everything is clear please let the experimenter know you are ready and she will begin the 2 minute presentation for you.

Appendix K: Memory Recall Test IBM-condition

Memory Recall Test **Participant Id:**

Advert 1: Satin Care Shaving Cream

1. Was this shaving cream for sensitive skin or normal skin?
2. What colour was the bottle's lid?

Advert 2: Yves Saint Laurent, Opium Perfume

1. What colour was the model's lipstick?
2. What was the model holding in her hand?

Advert 3: Gucci Handbag

1. What colour was the buckle on this bag?
2. Were the bags straps up, or down to the bags side?

Advert 4: Carolina Herrera, Perfume.

1. What colour were the curtains featured in this advertisement?
2. Was there a lampshade in this advertisement?

Advert 5: Make-up Pyramid

1. Were any of the items pictured in this pyramid a Revlon item?
2. Was there any red lipstick advertised?

Advert 6: Ralph Lauren Rocks, Perfume

1. What item of the models clothing matched the colour of the advertised perfume?
2. What was the pendent hanging from the models necklace?

Advert 7: Chanel, Chance Perfume

1. What colour were the models shoes?
2. What colour was the perfume?

Appendix L: Memory Recall Test Control-condition

Memory Recall Test **Participant Id:**

Advert 1: Satin Care

1. Is this shaving cream for sensitive skin or normal skin?
2. What colour was the bottle's lid?

Advert 2: Yves Saint Laurent, Opium Perfume

1. Were there any flowers in this advertisement?
2. What colour was the backdrop of this advertisement?

Advert 3: Gucci Handbag

1. What colour was the buckle on this bag?
2. Were the bags straps up, or down to the bags side?

Advert 4: Carolina Herrera, Perfume.

1. What colour were the curtains featured in this advertisement?
2. Was there a lampshade in this advertisement?

Advert 5: Make-up Pyramid

1. Were any of the items pictured in this pyramid a Revlon item?
2. Was there any red lipstick advertised?

Advert 6: Ralph Lauren Rocks, Perfume

1. What colour lid did the bottle of perfume have?
2. How many flowers were pictured on the right-hand side of the advertisement?

Advert 7: Chanel, Chance Perfume

1. Was the bottle placed on an angle?
2. What direction was the (liquid) perfume coming from?

Appendix M: Pre-manipulation Implicit Mood Stimuli

Trial	Nonsense word	Response items	Trial	Nonsense word	Response items
1	Nased	Reused Ceased **Pleased** Greased	2	Garcessed	Recessed **Depressed** Processed Regressed
3	Famure	Blur Demure **Secure** Nature	4	Iad	Had Lad **Mad** Pad
5	Thole	Sole **Whole** Mole Pole	6	Anful	Mindful Lawful Cupful **Cheerful**
7	Cower	Shower Tower Mower Grower	8	Stuwn	**Stupid** Stuart Student Studio
9	Timtrage	Beverage Storage **Discourage** Entourage	10	Gloce	Fence **Tense** Sense Hence
11	Cine	Dine Pine Line **Fine**	12	Bretain	**Uncertain** Curtain Fountain Mountain
13	Socong	Society Soccer Sockets Socrates	14	Amanrated	Illustrated **Frustrated** Demonstrated Infiltrated
15	Sapile	Satire Sapphire **Satisfied** Saturn	16	Inead	Tread Bread **Scared** Ahead
17	Fanatent	**Consistent** Patent Existent Advertent	18	Insket	Hassock Tussock Cassock Socket

Appendix N: Post-manipulation Implicit Mood Stimuli

Trial	Nonsense word	Response items	Trial	Nonsense word	Response items
1	Stroet	Reset **Upset** Cadet Tenet	2	Incoant	Recant **Pleasant** Replant Present
3	Uad	Had Pad **Sad** Fad	4	Foger	Jaeger **Anger** Singer Pager
5	Adood	**Good** Blood Hood Soot	6	Whad	Paid Lad **Glad** Tad
7	Maous	Famous **Anxious** Obvious Various	8	Leuse	Infuse House Douse **Confuse**
9	Dary	**Merry** Berry Very Ferry	10	Moree	Green Degree **Agree** Pedigree
11	Colthy	Timothy **Unworthy** Breathy Frothy	12	Reolped	**Relaxed** Related Relayed Relaunched
13	Comlet	Computer Commodity Compile Commute	14	Gload	Glove Globe Gloss **Gloom**
15	Confiart	Conference Confidante **Confident** Configure	16	Inconmure	Inconclusive Incongruent **Inconsistent** Inconspicuous
17	Eaook	Book Brook Cook Look	18	Grong	Throng **Strong** Prong Sarong

Appendix O: Study 1 Taste-Test Booklet

Taste Perceptions

It is very important that we ensure accurate taste ratings and hence that you follow the instructions (below) exactly.

Please taste and rate the M&Ms in the order that they are placed on the table (Bowl 1, followed by Bowl 2). Have as many M&Ms as is necessary to ensure accurate ratings. It is very important that you finish tasting and rating each type of M&M before you move on to the next one (e.g., complete your ratings for the crispy M&Ms in Bowl 1 before you begin rating the chocolate M&Ms in Bowl 2).

You should also have a drink of water in between rating each type of M&M in order to cleanse your palate. Once you have moved on to Bowl 2 (chocolate M&Ms) do not change your ratings for the previous crispy M&Ms (Bowl 1).

Because this is a standardized task you will be given 10 minutes in order to make your taste ratings. The experimenter will not be returning until the end of the 10 minute period.

If you finish early, please feel free to help yourself to both Bowls of M&Ms - we have tons of them, so many that we don't know what to do with them. You are welcome to do this because (for hygiene reasons) the two bowls of M&Ms will not be used for another participant and therefore will need to be discarded. Just make sure that you don't change any of your taste ratings.

Before you turn the page and begin the 10 minute taste test please take this opportunity to ask the experimenter any questions that you may have. She will not be in the room for the following 10 minutes.

Please now taste some crispy M&Ms from Bowl 1 and rate them on the following dimensions. Please eat as many crispy M&Ms as you need to in order to provide accurate ratings.

Remember not to move on to rating the chocolate M&Ms in Bowl 2 until you have completed rating the crispy M&Ms in Bowl 1.

These crispy M&Ms are:

	certainly not ▼						**certainly yes** ▼
tasty	1	2	3	4	5	6	7
desirable	1	2	3	4	5	6	7
flavoursome	1	2	3	4	5	6	7
appetising	1	2	3	4	5	6	7
crunchy	1	2	3	4	5	6	7
rough	1	2	3	4	5	6	7
healthy	1	2	3	4	5	6	7
chewy	1	2	3	4	5	6	7
sweet	1	2	3	4	5	6	7
enjoyable	1	2	3	4	5	6	7
smooth	1	2	3	4	5	6	7
sickly	1	2	3	4	5	6	7
too sweet	1	2	3	4	5	6	7
too crunchy	1	2	3	4	5	6	7

When you have completed rating the crispy M&Ms in Bowl 1 please take a drink of water and turn the page to complete the taste test for the chocolate M&Ms in Bowl 2.

Please now taste some chocolate M&Ms from Bowl 2 and rate them on the following dimensions. Please eat as many chocolate M&Ms as you need to in order to provide accurate ratings.

These chocolate M&Ms are:

	certainly not ▼						**certainly yes** ▼
tasty	1	2	3	4	5	6	7
desirable	1	2	3	4	5	6	7
flavoursome	1	2	3	4	5	6	7
appetising	1	2	3	4	5	6	7
crunchy	1	2	3	4	5	6	7
rough	1	2	3	4	5	6	7
healthy	1	2	3	4	5	6	7
chewy	1	2	3	4	5	6	7
sweet	1	2	3	4	5	6	7
enjoyable	1	2	3	4	5	6	7
smooth	1	2	3	4	5	6	7
sickly	1	2	3	4	5	6	7
too sweet	1	2	3	4	5	6	7
too crunchy	1	2	3	4	5	6	7

Thank you for completing the above ratings. Please complete the questions on the following page.

Please now make a comparison between the two types of M&Ms. To answer this question, you are now welcome to mix and match tasting the crispy M&Ms from Bowl 1, and the chocolate M&Ms from Bowl 2.

Please indicate (in the space below) which type of M&Ms you prefer, and please try and explain why. You are welcome to use any of the words from the rating scales (on the previous page, e.g., crunchy, sweet) in order to explain your preference.

Thank you for making the above comparison and participating in this study. There are still a few questions left for you to answer, but **the experimenter will not be returning until 10 minutes has passed.** Remember that if you have finished early you are welcome to help yourself to both Bowls of M&Ms. Just make sure that you don't change any of your taste ratings.

Appendix P: Study 2 Human Ethics Approval

Ref: HEC 2009/112

2 September 2009

Jessica Boyce
Department of Psychology
UNIVERSITY OF CANTERBURY

Dear Jessica

The Human Ethics Committee advises that your research proposal "Investigating the effects of ideal body media on dietary cognitions and intentions" has been considered and approved.

Please note that this approval is subject to the incorporation of the amendments you have provided in your email of 31 August 2009.

Best wishes for your project.

Yours sincerely

Dr Michael Grimshaw
Chair, Human Ethics Committee

Appendix Q: Study 2 Information Sheet

Information Sheet

Department of Psychology

INFORMATION
You are invited to participate as a subject in the research project 'Personality and Task Performance.'

The aim of this project is to understand whether certain types of women (e.g., with different personality traits) perform better or worse at certain tasks. Your involvement in this project will consist of completing two tasks and completing some self-report measures about your personality. The first task involves watching a brief slideshow and then completing an associated memory recall test, the second task is a computer-based task that will test your reaction time to very briefly presented words. This study is expected to take 40-45 minutes to complete.

Participation in this study is voluntary and you have the right to withdraw at any time, including withdrawal of any information provided.

The results of the project may be published, but you can be assured of the complete confidentiality of data gathered in this investigation. The identity of participants will not be made public without their consent. To ensure anonymity and confidentiality, you will be assigned a three-digit identification number and your name will not be associated with your data in any way.

The project is being carried out as a requirement of Jessica Boyce's PhD Thesis under the supervision of Dr. Roeline Kuijer, who can be contacted at 03 3642987 x. 3401. Roeline or Jessica (jessica.boyce@pg.canterbury.ac.nz) will be pleased to discuss any concerns you may have about participation in the project.

The project has been reviewed ***and approved*** by the University of Canterbury Human Ethics Committee.

Consent

I have read and understood the description of this project. On this basis, I agree to participate as a subject in this study on task performance. I consent to the publication of the results with the understanding that anonymity will be preserved.

I understand also that I may at any time withdraw from the project, including withdrawal of any information I have provided.

I note that this project has been reviewed ***and approved*** by the University of Canterbury Human Ethics Committee.

NAME (please print): …….. Date:
Signature:

Appendix R: Study 2 Debriefing Sheet

Debriefing Sheet

Thank you for taking your time to participate in this study. Previously you were told that this study was interested in your task performance and memory. However, this was a cover story and we would now like to take the time to fully debrief you on the study's purpose. The study was actually interested in the effects that thin images of women in the media have upon women's thought processes. You were randomly assigned to one of two conditions, in which you were asked to study a set of seven images. You may have been exposed to either, 1) thin images of models advertising certain products or, 2) our control condition, images of just the products (this served as a comparison condition). We were interested in how this exposure affected your subsequent performance on the reaction time task.

Briefly, we are interested in whether (in comparison with condition 2) those participants in condition 1 activate different thoughts (measured with the reaction time task). Directly following the slideshow and recall test you completed the reaction time task on the computer, this task included a mixture of unhealthy food words (e.g., cookie), diet related words (e.g., restraint), filler words (e.g., rock) and non-words (e.g., kown). This task is based upon the idea that people will generally attempt to approach goals (physically pull the joystick) and avoid temptations (physically push the joystick). We are interested in whether images of thin women (compared to control images) activated certain thoughts in our participants. For example, if images of thin women were to activate diet related thoughts then we would expect the participants to pull (approach) the joystick quickly when exposed to a diet-related word, and to push (avoid) the joystick quickly when exposed to an unhealthy food word.

We apologise for this degree of deception The level of deception used in this study was necessary to avoid priming you upon the nature of our study. If this has caused you any distress, or after this debriefing you are concerned about weight/body image issues and/or you would like advice with respect to changing health behaviours, we suggest that you make contact with one of the following services: your General Practitioner, phone the Healthline (0800-611 116) for advice, or contact Student Health & Counseling **03 364 2402. Alternatively you can contact the Psychology Centre (**03 343 9627), this Clinical Centre offers a wide range of assessment and therapy options.

I would like to remind you that you have the right to withdraw from the study at any time, including withdrawal of any information provided.

Sincerely

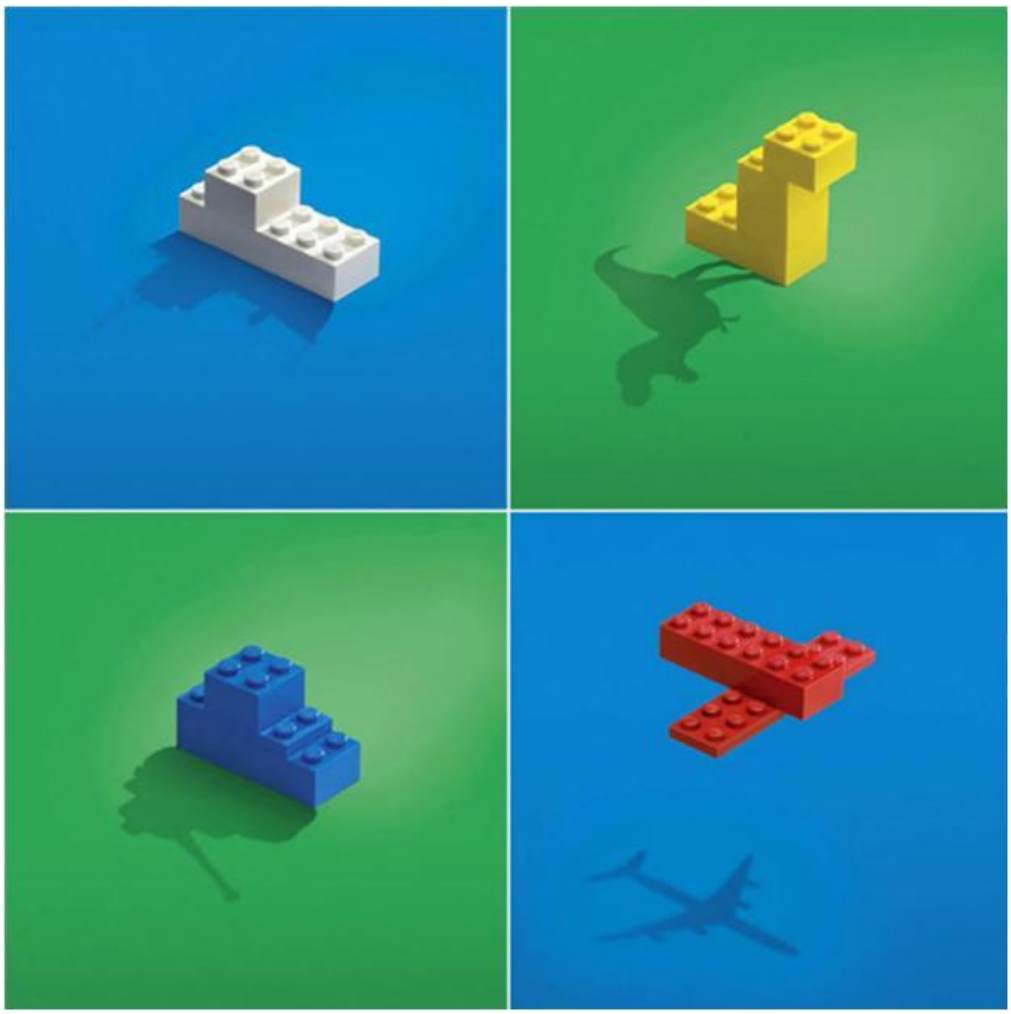
Jessica Boyce (PhD candidate) and Dr. Roeline Kuijer (Primary Supervisor)

Important: I have not completed running this study, so please do not talk about the underlying aim of this study to other students/possible participants (i.e., that we are interested in how women are affected by images of thin and attractive women). If you do, you will endanger the merits of this study.

Unfortunately, I cannot allow you to take this debriefing sheet away with you. However, Jessica (jessica.boyce@pg.canterbury.ac.nz), or her supervisor Dr. Roeline Kuijer (03 364 2987 x. 3401, roeline.kuijer@canterbury.ac.nz) will be happy to answer any of your questions relating to your participation.

Once again, thank you for your participation.

Appendix S: Example Stimuli Neutral-condition



Appendix T: Memory Recall Test Neutral-condition

Memory Recall Test **Participant Id:**

Advert 1: Lego

1. Was there a green piece of Lego?
2. What did the red piece of Lego look like in its shadow?

Advert 2: Gardening Books

1. How many books were advertised?
2. Were there people pictured on every cover?

Advert 3: Bedroom Furniture

1. What was the name of this furniture company?
2. What colour was the bedside lamp?

Advert 4: Printable Greeting Cards

1. Was there a Birthday card in this pack?
2. What animal appeared on the New Years card?

Advert 5: Scooters

1. How much was the most expensive scooter/motorcycle in this advert?
2. The scooters/motorcycles listed ranged from 50cc to what cc?

Advert 6: Design Ad

1. How many white tipped pencils were there?
2. Was the one orange tipped pencil near the top or near the bottom of the ad?

Advert 7: Computer Spring Clean

1. How many daises were pictured in this ad?
2. Was a contact email address provided?

Appendix U: LDT Target, Filler and Pseudo-words

Unhealthy food words	Diet words
Cake	Diet
Hamburger	Discipline
Fries	Self-Control
Chocolate	Weight-Goal
Cookie	Limit
Ice-Cream	Restraint

Neutral filler words		
Sticky	Glass	Window
Concrete	Plastic	Borrow
Rope	Wood	Sunglasses
Heat	Note	Airport
Self-Defense	Take	Wheel
Financial-Goal	Draft	Gale
Pseudo-words		
Baper	Aiography	Briver
Pird	Bount	Dusy
Pesk	Iar	Wo-Korker
Dhone	Cerview	Higeon-Fole
Tarden	Ainting	Fo-Coperation
Graffic	Parist	Relf-Sighteous
Coad	Batistics	Melf-Macrifice
Rhess	Sedroom	Hupervise
Uail	Borning	Sistory
Mnicorn	Mabysit	Bire

Appendix V: Study 3 Phase 1 Information Sheet

Online Consent Form

Department of Psychology

This online questionnaire should only take 10 minutes to complete. The project has been reviewed and approved by the Department of Psychology's Research Committee.

The aim of this project is to understand whether certain types of people (e.g., with different personality traits) have significantly different sensory experiences from one another (e.g., do they hear the same noise in the same way, or do they taste the same foods in a similar way). Your involvement in this project will consist of two phases, 1) a pre-test questionnaire assessing your personality and your five senses (you will complete this online soon), and 2) completing a simple sensory experiment with me in person at an arranged time.

To ensure your confidentiality, the personal details that you provide on the first page of the questionnaire will be stored separately from this questionnaire (phase 1) and the subsequent data you will provide in phase 2. You may withdraw your participation at any time.

Please answer all of the questions according to the instructions. If you are unsure about how to answer, please give the best answer you can. There are no 'correct' or 'incorrect' answers: We are interested in how you feel and what you think. Do not take too long over your replies; your immediate reaction to each question will probably be more accurate than a long thought-out response.

Please note: PSYC 105 or 106 students will be reimbursed for their time with course credit.

To receive this reimbursement all participants need to participate in both phases 1 and 2. This quick online questionnaire is Phase 1. You will not be reimbursed if you only complete this online questionnaire (phase 1). You must also complete phase 2 in person.

Your participation is very much appreciated. Before completing the questionnaire please read the consent form below.

Yours sincerely,

Jessica Boyce (jessica.boyce@pg.canterbury.ac.nz) and Dr Roeline Kuijer

CONSENT: Personality and the Five Human Senses (phase 1 of 2)

I have read and understood the description of the above-named study. On this basis I agree to participate, and I consent to the publication of the results of this study with the understanding that confidentiality will be preserved. I understand also that I may at any time withdraw from the study, including withdrawal of any information that I have provided.

By selecting the box below you consent to participate in this online survey.

Appendix W: Study 3 Phase 2 Information Sheet

Information Sheet

Department of Psychology

INFORMATION
You are invited to participate as a subject in the research project 'Personality and the Five Human Senses.'

The aim of this project is to understand whether certain types of people (e.g., with different personality traits) have significantly different sensory experiences from one another (e.g., do they hear the same noise in the same way, or do they taste the same foods in a similar way). Your involvement in this project will consist of completing one sensory experience and completing some self-report measures about your personality. The sensory experience will be based upon one of the five human senses (smell, sight, taste, touch or sound), you will be randomly assigned to complete only one of these tasks. This study is expected to take 45-50 minutes to complete.

Participation in this study is voluntary and you have the right to withdraw at any time, including withdrawal of any information provided.

The results of the project may be published, but you can be assured of the complete confidentiality of data gathered in this investigation: the identity of participants will not be made public. To ensure anonymity and confidentiality, you will be assigned a three-digit identification number and your name will not be associated with your data in any way.

The project is being carried out as a requirement of Jessica Boyce's PhD thesis under the supervision of Dr. Roeline Kuijer, who can be contacted at 03 3642987 x. 3401.

Roeline or Jessica (jessica.boyce@pg.canterbury.ac.nz) will be pleased to discuss any concerns you may have about participation in the project.

The project has been reviewed and approved by the University of Canterbury Human Ethics Committee.

Consent

I have read and understood the description of this project. On this basis, I agree to participate as a subject in this study on 'Personality and the Five Human Senses'. I consent to the publication of the results with the understanding that anonymity will be preserved.

I understand also that I may at any time withdraw from the project, including withdrawal of any information I have provided.

I note that this project has been reviewed and approved by the University of Canterbury Human Ethics Committee.

NAME (please print): …….. Date:
Signature:

Appendix X: Study 3 Taste-Test Booklet

Taste Experience

Please taste and rate the four types of food in the order that they are placed on the table (e.g., Bowl 1, followed by Bowl 2). Please eat as much as you need to ensure accurate ratings. Please finish tasting and rating each bowl before you move on to the next bowl (e.g., complete your ratings for Bowl 1 before you begin rating the food in Bowl 2 etc).

You should also have a drink of water in between rating each bowl of food in order to cleanse your palate. Because this is a standardized task you will be given 10 minutes in order to complete your taste experience. The investigator will not be returning until the end of the 10 minute period. If you finish early, please feel free to help yourself to any of the food.

Before you turn the page and begin the 10 minute taste experience please take this opportunity to ask the investigator any questions that you may have. She will not be in the room for the following 10 minutes.

Please now taste some of the food from Bowl 1 and rate it on the following dimensions. Please eat as much of the food as you need to in order to provide accurate ratings.

Please do not move on to rating the food in Bowl 2 until you have completed rating the food in Bowl 1.

This food in Bowl 1 is:

	certainly not ▼						**certainly yes** ▼	
tasty	1	2	3	4	5	6	7	NA
bitter	1	2	3	4	5	6	7	NA
flavoursome	1	2	3	4	5	6	7	NA
sour	1	2	3	4	5	6	7	NA
likeable	1	2	3	4	5	6	7	NA
healthy	1	2	3	4	5	6	7	NA
high in calories	1	2	3	4	5	6	7	NA
salty	1	2	3	4	5	6	7	NA
sweet	1	2	3	4	5	6	7	NA
sickly	1	2	3	4	5	6	7	NA
low in fat	1	2	3	4	5	6	7	NA
comforting	1	2	3	4	5	6	7	NA
distracting	1	2	3	4	5	6	7	NA

When you have completed rating the food in Bowl 1 please take a drink of water and move on to rating the food in Bowl 2 on the next page.

Please now taste some of the food from Bowl 2 and rate it on the following dimensions. Please eat as much as you need to in order to provide accurate ratings.

This food is:

	certainly not ▼						**certainly yes** ▼	
tasty	1	2	3	4	5	6	7	NA
bitter	1	2	3	4	5	6	7	NA
flavoursome	1	2	3	4	5	6	7	NA
sour	1	2	3	4	5	6	7	NA
likeable	1	2	3	4	5	6	7	NA
healthy	1	2	3	4	5	6	7	NA
high in calories	1	2	3	4	5	6	7	NA
salty	1	2	3	4	5	6	7	NA
sweet	1	2	3	4	5	6	7	NA
sickly	1	2	3	4	5	6	7	NA
low in fat	1	2	3	4	5	6	7	NA
comforting	1	2	3	4	5	6	7	NA
distracting	1	2	3	4	5	6	7	NA

When you have completed rating the food in Bowl 2 please take a drink of water and move on to rating the food in Bowl 3 on the next page.

Please now taste some of the food from Bowl 3 and rate it on the following dimensions. Please eat as much as you need to in order to provide accurate ratings.

This food is:

	certainly not ▼						**certainly yes** ▼	
tasty	1	2	3	4	5	6	7	NA
bitter	1	2	3	4	5	6	7	NA
flavoursome	1	2	3	4	5	6	7	NA
sour	1	2	3	4	5	6	7	NA
likeable	1	2	3	4	5	6	7	NA
healthy	1	2	3	4	5	6	7	NA
high in calories	1	2	3	4	5	6	7	NA
salty	1	2	3	4	5	6	7	NA
sweet	1	2	3	4	5	6	7	NA
sickly	1	2	3	4	5	6	7	NA
low in fat	1	2	3	4	5	6	7	NA
comforting	1	2	3	4	5	6	7	NA
distracting	1	2	3	4	5	6	7	NA

When you have completed rating the food in Bowl 3 please take a drink of water and move on to rating the food in Bowl 4 on the next page.

Please now taste some of the food from Bowl 4 and rate it on the following dimensions. Please eat as much as you need to in order to provide accurate ratings.

This food is:

	certainly not ▼						**certainly yes** ▼	
tasty	1	2	3	4	5	6	7	NA
bitter	1	2	3	4	5	6	7	NA
flavoursome	1	2	3	4	5	6	7	NA
sour	1	2	3	4	5	6	7	NA
likeable	1	2	3	4	5	6	7	NA
healthy	1	2	3	4	5	6	7	NA
high in calories	1	2	3	4	5	6	7	NA
salty	1	2	3	4	5	6	7	NA
sweet	1	2	3	4	5	6	7	NA
sickly	1	2	3	4	5	6	7	NA
low in fat	1	2	3	4	5	6	7	NA
comforting	1	2	3	4	5	6	7	NA
distracting	1	2	3	4	5	6	7	NA

Thank you for completing the above ratings. Please complete the questions on the following page.

Please order the types of food from your most favourite to your least favourite.

1. My favourite food used in this taste experience was the….
2. My second favourite food used in this taste experience was the…
3. My third favourite food used in this taste experience was the…
4. My least favourite food used in this taste experience was the…
5. In my own time I would most often buy/consume the….
   (please choose <u>one</u> of the four foods to answer this question)

Thank you, you're finished this part of the study. If the investigator is not in the room, please wait patiently. You're welcome to eat any of the foods in the four bowls while you wait (we have a fairly large supply so don't worry) but please don't change any of your ratings, as the taste experience is now over.

If the investigator is in the room, please let her know that you're finished.

Appendix Y: Study 3 Debriefing Sheet

Debriefing Sheet

Thank you for taking your time to participate in the study entitled 'Personality and The Five Human Senses', and the study on 'Task Performance and Coping Skills'. You were previously informed that these two studies were unrelated to one another; in reality they were both part of the study for Jessica's PhD which is investigating the effects of thin fashion models on female thought processes and eating behaviour. To ensure that this experiment remained experimentally valid, all participants were unaware that the two studies were related. We would now like to take the time to fully debrief you upon the nature of your participation and what we were actually investigating.

You were randomly assigned to view either neutral images (e.g., stationary & furniture) or images of thin and attractive fashion models. This first study that you participated in was not actually investigating Task Performance; we actually were interested in how these images of thin women (vs. viewing neutral images) might affect your performance on the computerized reaction time task and your behaviour during the taste-test.

Directly after you viewed these images (of either thin models or neutral images) you completed the reaction time task on the computer, this task included a mixture of unhealthy food words (e.g., cookie), diet related words (e.g., restraint), filler words (e.g., rock) and non-words (e.g., kown). This task is based upon the idea that people will generally attempt to avoid temptations (physically push the joystick away from themselves). We are interested in whether images of thin women (compared to the neutral images) activated certain thoughts in our participants. For example, *if* images of thin women were to activate diet related thoughts then we would expect the participants to push (avoid) the joystick quickly when exposed to an unhealthy food word (e.g., cookie).

After you completed the reaction time task on the computer we moved on to the study 'Personality and the Five Human Senses'. You were lead to believe that you assigned yourself to the 'taste' condition. In reality all the pieces of paper in the hat would have assigned you to the taste condition, as we wanted all our participants to move on and complete the taste test. Here, we were also interested in whether participants who had been exposed to the images of thin models (compared to the neutral images) would eat a different amount of food during the 10-minute taste test.

We apologise for using deception, but assure you that we would not have included such deception unless it was entirely necessary for the purpose of our research. Evidence suggests that if the participants are aware that these measures are associated with exposing them to images of thin and attractive women then they will respond in a different 'socially desirable' manner. Therefore, deception was employed to avoid this confounding variable that would make our findings illegitimate. If this deception has caused you any distress, or after this debriefing you are concerned about weight/body image issues and/or you would like advice with respect to changing health behaviours, we suggest that you make contact with one of the following services: your General Practitioner, phone the Healthline (0800-611 116) for advice, or contact Student Health & Counseling **03 364 2402. Alternatively you can contact the Psychology Centre (**03 343 9627), this Clinical Centre offers a wide range of assessment and therapy options.

Once again, thank you for your participation. I would like to remind you that you have the right to withdraw from the study at any time, including withdrawal of any information provided.

Sincerely
Jessica Boyce (PhD candidate) and Dr. Roeline Kuijer (Primary Supervisor)

Important: Please do not talk about the underlying aim of this study to other students/possible participants (i.e., that we are interested in how women are affected by images of thin and attractive women, or that everyone is assigned to complete the taste test). If you do, you will endanger the merits of this study. Unfortunately, I cannot allow you to take this debriefing sheet away with you. However, Jessica (jessica.boyce@pg.canterbury.ac.nz), or her supervisor Dr. Roeline Kuijer (03 364 2987 x. 3401, roeline.kuijer@canterbury.ac.nz) will be happy to answer any of your questions relating to your participation.