



Research report

Mixed selection. Effects of body images, dietary restraint, and persuasive messages on females' orientations towards chocolate

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ABSTRACT

Many women experience ambivalent reactions to chocolate: craving it but also wary of its impact on weight and health. Chocolate advertisements often use thin ideal models and previous research indicates that this exacerbates ambivalence. This experiment compared attitudes to, and consumption of, chocolate following exposure to images containing thin or overweight models together with written messages that were either positive or negative about eating chocolate. Participants (all female) were categorised as either low- or high-restraint. Approach, avoidance and guilt motives towards chocolate were measured and the participants had an opportunity to consume chocolate. Exposure to thin ideal models led to higher approach motives and this effect was most marked among the high restraint participants. Avoidance and guilt scores did not vary as a function of model size or message, but there were clear differences between the restraint groups, with the high restraint participants scoring substantially higher than low restraint participants on both of these measures. When the participants were provided with an opportunity to eat some chocolate, those with high restraint who had been exposed to the thin models consumed the most.

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Introduction

Chocolate evokes mixed reactions in many women. It is one of the most craved foodstuffs among females, much enjoyed for its sensory properties (Rozin, Levine, & Stoess, 1991). Yet it can also be a source of concern because its calorific density presents risks of unwanted weight gain and because some consumers fear possible stigmatization for self-indulgence (Macht & Dettmer, 2006; Rogers & Smit, 2000; Rozin, Bauer, & Catanese, 2003). Recent studies have confirmed that chocolate evokes ambivalent attitudes (Cartwright & Stritzke, 2008; Hormes & Rozin, 2011; Rodgers, Stritzke, Bui, Franko, & Chabrol, 2011; Rodríguez, Fernandez, Cepeda-Benito, & Vila, 2005). Research with both children (Cartwright et al., 2007) and adults (Cartwright & Stritzke, 2008; Rodgers et al., 2011) has demonstrated that attitudes to this sweet can be distinguished into approach, avoidance, and guilt components. Importantly, these conflicting orientations are experienced often simultaneously. An individual can find herself at once drawn to chocolate but also anxious to avoid it and experiencing feelings of guilt if she consumes it. For example, high chocolate cravers reported feeling more joyful *and* more guilty than lower cravers

after eating chocolate (Moreno-Dominguez, Rodriguez-Ruiz, Martin, & Warren, 2011).

Consumers' ambivalence towards chocolate has implications both for those who seek to promote sales of it (e.g., advertisers) and for those who wish to provide advice about its consumption (e.g., health educators). In each context, issues arise concerning the impact of imagery and messages that might be employed in communicating with audiences: in response to any advertisement or warning, conflicting orientations could be instigated. At present, we lack information on the patterns of such reactions as a function of the nature of the communications. In this study, we examined the impact of visual imagery and verbal message contents on women's orientation to and consumption of chocolate.

Influencing feelings about chocolate

Affective orientations towards chocolate are not stable but vary as a function of hunger, mood, food related cognitions, information about nutritional contents, and exposure to the stimulus object or images of it (Benford & Gough, 2006; Fletcher, Pine, Woodbridge, & Nash, 2007; Hormes & Rozin, 2011; Mooney, Farley, & Strugnell, 2009; Rodríguez et al., 2005; Rolls & McCabe, 2007; Steenhuis, 2009). Levels of approach, avoidance, and guilt orientations may each change in response to salient experiences, such as encountering an advertisement intended to promote desire for the sweet, or

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receiving a nutritionist's warning that too much can be bad for you. Visual imagery is used extensively in advertisements for most products, including chocolate. Exposure to images of chocolate can certainly heighten desire for it (Fletcher et al., 2007; Rolls & McCabe, 2007). Perhaps paradoxically, visual ads for chocolate often include also images of slender female models (Geiger & Fennell, 2003). It seems that advertisers wish to enhance the appeal of the foodstuff by associating it with the 'thin ideal.' The desire to be thin is highly motivating for many women throughout the lifespan (Levine & Murnen, 2009; Tiggemann, 2002) and advertisers may aim to exploit this aspiration. In contrast, a possible strategy for health educators who wish to alert the public to the consequences of over-indulgence is to associate the product with images of overweight women. We consider below the implications of these different visual strategies for affective reactions.

A related way to provide information about a foodstuff is to describe it and its consequences. As well as visual imagery, most advertisements contain some verbal or textual message about the desirability of the product. In the case of chocolate, these messages are often about its smooth and delectable taste (Hill & Radimer, 1997). Most health communications about chocolate, in contrast, disseminate warnings about the deleterious results of excess, emphasising weight gain and associated risks, and advising lower levels of consumption (American Dietetic Association & Duyff, 2006; Johnson, Hackett, Bibby, & Cross, 1999).

Message type and ambivalent reactions

Messages about chocolate could, then, be intended to promote its appeal (e.g., via advertising) or to moderate its consumption (e.g., via health education). The associated visual images could include thin or overweight women; the accompanying verbal texts could be positive or negative. Relatively little is known of how these messages affect audiences. Research into the effects of thin ideal imagery on female audiences has yielded mixed results (Mills, Polivy, Herman, & Tiggemann, 2002). Several investigators have reported negative affect and body dissatisfaction following exposure to this kind of imagery (Dittmar, Halliwell, & Stirling, 2009; Dittmar & Howard, 2004; Thompson & Stice, 2001; Yamamiya, Cash, Melnyk, Posavac, & Posavac, 2005; see Grabe, Ward, & Hyde, 2008; Levine & Murnen, 2009 for reviews). Body dissatisfaction can lead to dieting and eating pathologies (Polivy & Herman, 2002; Stice, Marti, & Durant, 2011). The common advertising strategy of highlighting the thin ideal perpetuates images that many women believe are perceived as attractive (Brown & Slaughter, 2011) and, in combination with chocolate, it represents a foodstuff that is also perceived as attractive. Yet, the physical image is essentially unattainable and potentially anxiety-inducing and the foodstuff is associated with craving and bingeing.

Hence, in the context of chocolate, there is the possibility that the strategy could be counterproductive from an advertiser's perspective. The thin image + chocolate advertisement is a potent context for arousing ambivalent feelings. If the presence of thin models makes the commercial aversive, consumers' enthusiasm for the product itself might be tempered. Geiger and Fennell (2003) found in a qualitative study that many women expressed cynicism about chocolate + thin model ads and awareness of the paradox: "You can't look that good and eat chocolate" (p. 112). On the other hand, from a health campaigner's perspective, inciting aversive responses towards chocolate could be precisely the intended goal.

The picture is complicated, however, because some women appear to experience self-enhancement effects from exposure to thin ideal models, perhaps because they are inspired by the standards

of physical 'excellence' that the models represent (Joshi, Herman, & Polivy, 2004; Mills et al., 2002). If the presence of thin models makes the ad attractive or motivating, then this supports the advertisers' assumptions and the possibility arises that the use of thin models could promote the appeal of chocolate, at least for some proportion of the audience.

Other images of females could, in principle, be used in representations of chocolate. For example, women of more natural shapes, including larger women, could be employed as models. Consider the possible consequences of having overweight women associated with chocolate. From an advertiser's perspective, this might not seem a helpful conjunction, because the large model could serve as a visible reminder to female consumers that chocolate can cause weight gain. Fear of being perceived as 'fat' is common among women (Cash & Hicks, 1990; Lieberman, Tybur, & Latner, 2011). In Western societies, portrayals of overweight people in the media tend to represent them as unattractive (Greenberg, Eastin, Hofschire, Lachlan, & Brownell, 2003). Overweight images can elicit negative stereotypes, prejudices and even disgust in the audience (Lieberman et al., 2011; Solbes & Enesco, 2010; Vartanian, 2010). Yet, from a health campaigner's perspective, this reminder might be a message worth emphasising. Highlighting overweight as a possible association of chocolate could reduce its appeal and encourage women to avoid it, or feel guilty about consuming it. In combination with chocolate, then, an image of an overweight person could be an ambivalent stimulus.

Note that none of the reactions considered above should be assumed to be the exclusive response to a given advertisement or message. We stress again that chocolate, and hence representations of chocolate, can evoke mixed and ambivalent reactions (Cartwright & Stritzke, 2008; Moreno-Dominguez et al., 2011). Thus, an advertisement intended to sell chocolate could well increase desire for it (approach) but at the same time could inadvertently remind a prospective purchaser that this is a foodstuff she ought to eat less of (avoidance) and that she would feel she has violated a personal dietary standard if she desires or consumes it (guilt). Similarly, a health warning about excess consumption might lead an individual to eat less (avoidance) but could also bring to mind just how enjoyable the product is (approach); it could remind her that she has succumbed regularly to temptation (guilt), or, if models with more rotund shapes are associated with chocolate, it could provide an opportunity for favourable social comparison (less guilt).

Relatively little empirical evidence is available on which of the possible outcomes of exposure to different types of chocolate advertisements/warnings actually obtain. However, in one study, Durkin, Rae, and Stritzke (2012) investigated the effect of viewing thin and overweight images of models in chocolate advertisements on ambivalent attitudes towards the product. Female participants were allocated to a thin model condition, an overweight model condition, or a control group (no ads). Following exposure, participants in the thin condition had increased avoidance, approach and guilt scores on the Orientation to Chocolate Questionnaire (Cartwright & Stritzke, 2008; Cartwright et al., 2007), while participants in the overweight condition had decreased approach and guilt scores, with no change in avoidance. Control participants demonstrated ambivalence, but no changes over time. The authors concluded that common advertising strategies for chocolate (i.e., chocolate + thin model images) are likely to exacerbate ambivalence in female consumers.

Although Durkin et al.'s (2012) findings support the argument that women's reactions to different types of images about chocolate are ambivalent, the study had some limitations. First, it did not collect a behavioural measure (i.e., eating chocolate); hence, it did not test whether different conditions impact on actual consumption, arguably the most direct test of effects. Second, it did

not differentiate among participants in terms of their dietary restraint; a person's commitment to dieting may be expected to bear on her reactions to food-related stimuli, though, as discussed below, the direction of effect is controversial.

Dietary restraint

One expectation might be that restrained eaters (those who diet) should consume less food after exposure to images of women conforming to the stereotypical thin ideal. The thin model might remind a dieter of the importance of regulating food intake and provide an image of success. Strauss, Doyle, and Kreipe (1994) measured low and high dietary restraint female participants' food consumption (chocolates and/or peanuts) after exposure to diet-oriented ads with thin models. The experimenters predicted that the restrained eaters would consume significantly less than their counterparts. Strikingly, the results were the opposite: High restrained participants in the thin model condition ate nearly twice as much as other participants. Several other studies have since reported similarly that restrained eaters tend to consume more food after exposure to images of the stereotypical thin ideal than do less restrained eaters (Mills et al., 2002; Monro & Huon, 2006; Strauss et al., 1994; Warren, Strauss, Taska, & Sullivan, 2005).

The present study

Taken together, the available literature suggests that associating thin models with chocolate could exacerbate women's ambivalence towards the product, though there is a need to determine which individuals are affected, in which ways, under which conditions. In the experiment to be reported here, we compared attitudes to, and consumption of, chocolate following exposure to images containing thin or overweight models together with written messages that were either positive or negative about eating chocolate. Participants (all female) were categorised as either low- or high-restraint. Dependent variables were scores on the three subscales of the Orientation to Chocolate Questionnaire and a measure of chocolate consumption.

We expected that the exposure to chocolate with thin models should be the most potent stimulus, though this should interact with the restraint status of the participants. Specifically, we predicted, consistent with the findings of Durkin et al. (2012), that affective orientations toward chocolate (approach, avoidance, and guilt), as well as consumption of chocolate, should be higher among women exposed to thin models + chocolate. However, as argued by Mills et al. (2002, p. 1688), restrained eaters could be expected to be most sensitive to idealised body images 'because weight and shape are personally relevant for them and because their dieting is essentially an attempt to bring their weight and/or shape more in line with the ideal.' Hence, we predicted that higher affective orientations to the thin models + chocolate ads should be most pronounced among those with high restraint. For similar reasons, images of overweight women and chocolate, whilst potentially discomfiting to many women, should be particularly so for those with high restraint (Vartanian, Herman, & Polivy, 2005), because they are actively committed to avoiding weight gain. We expected that avoidance and guilt orientations should be higher among restrained eaters exposed to overweight models + chocolate, and consumption should be lower.

The effects of manipulating the valence of the accompanying verbal messages were treated as an exploratory dimension of this study. On first consideration, it might appear possible that positive messages should enhance the appeal of chocolate and that negative messages should have the opposite effect. However, people do not always respond in direct compliance with the valence of

health-related dietary messages (Eden, Bear, & Walker, 2008; O'Key & Hugh-Jones, 2010). Furthermore, our theoretical assumption is that competing orientations can be evoked or exacerbated simultaneously; in this context, positive or negative messages could have intended and unintended consequences (e.g., a warning of negative outcomes could remind a person that chocolate is 'naughty' but also that it is 'nice'). We expected that those most sensitive to eating-related information (i.e., high restraint participants) would be most affected by message content and we sought evidence of the direction of any effects in the different conditions.

Method

Participants

A sample of 80 female participants aged between 17 and 26 ($M = 21.76$, $SD = 2.28$) participated. Mean BMI was 23.04, $SD = 3.5$. Participants were students, recruited from two universities in a large UK city. Individual data on SES and ethnicity were not collected; however, the universities' intakes are upper working to middle class. Ethnically, the sample was mixed but with a predominance of people of white European backgrounds.

Design

A between-groups design was employed. The independent variables were model size (thin vs. overweight), message type (positive vs. negative), and restraint status (low vs. high), with the latter factor based on a median-split of scores on the Restraint Scale (Herman, Polivy, Pliner, Threlkeld, & Munic, 1978). The dependent variables were responses to the approach, avoidance and guilt subscales of the Orientation to Chocolate Questionnaire (Cartwright & Stritzke, 2008; Cartwright et al., 2007), and in-laboratory chocolate consumption.

Materials

Chocolate advertisements

Four sets of chocolate advertisements were prepared for this study, so that there were two levels of model size (thin or overweight), crossed with two types of message (positive or negative). Thus, each participant received one of the four possible combinations (thin model + positive messages; thin model + negative messages; overweight model + positive messages; overweight model + negative messages). The advertisements were presented to participants in the guise of a questionnaire (see 'Procedure'). Each 'questionnaire' contained 10 photographs of women who were eating, holding or situated beside chocolate. All photographs were taken from websites relating to chocolate/food consumption/dieting. All models appeared to be in their 20s or 30s.

Each photograph was accompanied by a printed message. Positive and negative messages about chocolate were selected from sources on the internet. We examined sites that promoted the consumption of chocolate and sites that warned against consumption or excessive consumption. We sought statements that conveyed a clear recommendation, claim or allegation. Thus, the messages were authentic and succinct instances of the kinds of information that are available to interested consumers via the mass media.

Examples of positive messages were: 'Indulge in the creamy taste of chocolate', 'Chocolate: good mood food!', 'Chocolate: beneficial for heart and health', 'The mere smell of chocolate can cause you to relax', 'Eating chocolate raises serotonin levels in the brain, resulting in a sense of well being'. Examples of negative messages were: 'Chocolate: a moment on the lips, forever on the hips', 'Milk chocolate is high in calories, saturated fat and sugar', 'Eating large

amounts of chocolate can cause obesity', 'Chocolate bars contain additives which are harmful to general health', 'Chocolate contains a large amount of lead, which in turn could cause lead poisoning.'

The Restraint Scale (Herman et al., 1978)

This standard instrument was used to measure dietary restraint. Cronbach's alpha for this sample was .88. The median score for this sample was 15 (range 1–25), consistent with previous research (Polivy, Heatherton, & Herman, 1988). Participants below the median were classified as low restraint and those above the median were classified as high restraint.

The Orientation to Chocolate Questionnaire (OCQ; Cartwright & Stritzke, 2008; Cartwright et al., 2007)

The OCQ was used to measure three components associated with chocolate craving: approach (6 items; example: 'I wanted to eat chocolate as soon as I had the chance'), avoidance (2 items; example: 'I deliberately occupied myself so I would not want chocolate') and guilt (6 items; example: 'I felt guilty after eating chocolate'). Respondents rated their degree of agreement with each item on a 1 (not at all) to 9 (very strongly) scale. Cronbach's alphas for the present sample were approach = .85, avoidance = .70, and guilt = .94.

Word completion task

A word completion task was devised as a distractor activity. This contained 40 non-completed words taken from the Edinburgh Associative Thesaurus.

Chocolate

A bowl containing squares of Cadbury's dairy milk chocolate was used to measure chocolate consumption. Each bowl contained 10 squares of chocolate.

Procedure

Participants were tested individually in a quiet room on campus. The Restraint Scale was completed first. Then, participants were given the experimental stimuli, presented as a Chocolate Advertisements Questionnaire. There were equal numbers of the four different versions and these were allocated randomly. Participants were told that the study 'is concerned with people's responses to various media images associated with particular foodstuffs, in this case chocolate. We are interested in your thoughts on whether a particular advertisement would make you less or more likely to eat the product.' They were asked to examine each advertisement carefully and then to enter their evaluations of the likely impact of each picture on 1–10 scales, where '1' represented 'less likely' and '10' represented 'more likely'. Thus, the task was intended to focus the participants' attention on the images and on the messages beside them.

The Orientation to Chocolate Questionnaire was then administered. Finally, the Word Completion Task was completed. During this task, a box of chocolates was laid out on the table for participants and they were advised that they could help themselves.

Results

Because participants had been allocated at random to condition, we checked first whether age or BMI varied across conditions. For age, there were no effects approaching significance. For BMI, there was a significant main effect of restraint group only, $F(1,72) = 10.22$, $p = .002$, $\eta_p^2 = .12$. As is usually found (Mills et al., 2002; Polivy, Herman, & Deo, 2010), the high restraint participants had a higher mean BMI ($M = 24.4$, $SD = 3.51$) than did the low re-

straint participants ($M = 21.75$, $SD = 3.05$). All of the analyses reported below were re-run with BMI as a covariate. This did not change the pattern of results.

Approach

Approach scores were submitted to a 2 (Model size: Thin vs. Overweight) \times 2 (Message valence: Positive vs. Negative) \times 2 (Restraint group: Low vs. High) between-subjects ANOVA. This analysis yielded a significant main effect of model size, $F(1,72) = 15.34$, $p < .001$, $\eta_p^2 = .18$. Participants exposed to the thin models had higher approach scores ($M = 5.46$, $SD = 1.35$) than did participants exposed to the overweight models ($M = 4.25$, $SD = 1.83$). There was also a significant main effect of restraint, $F(1,72) = 20.12$, $p < .001$, $\eta_p^2 = .22$. High restraint participants had higher approach scores ($M = 5.54$, $SD = 1.61$) than did low restraint participants ($M = 4.17$, $SD = 1.55$). However, these effects were qualified by two significant interactions: Model \times Restraint Group, $F(1,72) = 7.95$, $p = .006$, $\eta_p^2 = .1$, and Message \times Restraint Group, $F(1,72) = 6.89$, $p = .01$, $\eta_p^2 = .09$. No other effects approached significance, $F_s < 1.18$. Means and standard deviations for approach scores by model size and message valence for each restraint group are shown in Table 1.

The Model \times Restraint Group interaction was interpreted by conducting tests of simple effects. These showed that, among the high restraint participants, approach scores of those exposed to the thin model did not differ significantly from those exposed to the overweight model. Among the low restraint participants, however, those exposed to the thin model had substantially higher approach scores ($M = 5.11$, $SD = 1.46$) than did those exposed to the overweight model ($M = 3.02$, $SD = 1.13$), $F(1,78) = 5.81$, $p < .001$, $d = 1.47$.

Analysis of the Message Valence \times Restraint Group interaction showed that, among the high restraint participants, those exposed to the positive messages ($M = 5.77$, $SD = 1.60$) did not have significantly different approach scores from those exposed to the negative messages ($M = 5.33$, $SD = 1.62$), $F(1,78) = .07$, n.s. Among the low restraint participants, in contrast, those exposed to the positive messages ($M = 3.51$, $SD = 1.52$) had significantly lower approach scores than those exposed to the negative messages ($M = 4.68$, $SD = 1.35$), $F(1,78) = 7.10$, $p = .009$, $d = .81$.

Avoidance

Avoidance scores were submitted to the same three-way ANOVA design as above. This analysis revealed only a significant main effect for restraint group, $F(1,72) = 5.17$, $p = .03$, $\eta_p^2 = .07$. The high restraint participants had a higher orientation towards avoiding chocolate ($M = 4.13$, $SD = 1.74$) than did the low restraint participants ($M = 3.25$, $SD = 1.74$).

Guilt

Analysis of guilt scores were submitted to the same ANOVA design and revealed also only a significant main effect for restraint group, $F(1,72) = 5.17$, $p < .001$, $\eta_p^2 = .47$. Participants with high restraint reported markedly higher levels of chocolate-related guilt ($M = 6.75$, $SD = 1.59$) than did participants with low restraint ($M = 3.88$, $SD = 1.54$).

Chocolate consumption

The number of squares of chocolate that participants consumed was also analysed using the same three way design. This analysis revealed a significant main effect of model size, $F(1,72) = 5.58$, $p = .02$, $\eta_p^2 = .07$, which was qualified by a significant model size

Table 1
Approach scores as a function of restraint group, model size, and message valence.

		Low restraint			High restraint			
		Thin model	Overweight model	Combined	Thin model	Overweight model	Combined	
Message valence	Positive	4.65 (1.28) (n = 11)	2.54 (.93) (n = 13)	3.51 (1.52)	Positive	5.70 (1.43) (n = 9)	5.86 (1.91) (n = 7)	5.77 (1.60)
	Negative	5.75 (.60) (n = 8)	3.72 (1.07) (n = 9)	4.68 (1.35)	Negative	5.72 (1.55) (n = 12)	4.89 (1.67) (n = 11)	5.33 (1.62)
	Combined	5.11 (1.17)	3.02 (1.53)		Combined	5.71 (1.46)	5.27 (1.78)	

Note: Means linked by a bar are significantly different from each other.

Table 2
Number of squares of chocolate eaten as a function of restraint group, model size, and message valence.

		Low restraint			High restraint			
		Thin model	Overweight model	Combined	Thin model	Overweight model	Combined	
Message valence	Positive	2.00 (1.09) (n = 11)	1.85 (.69) (n = 13)	1.92 (.88)	Positive	2.56 (1.01) (n = 9)	1.29 (.76) (n = 7)	2.00 (1.10)
	Negative	1.25 (.46) (n = 8)	2.00 (1.00) (n = 9)	1.65 (.86)	Negative	2.50 (1.00) (n = 12)	1.18 (1.07) (n = 11)	1.87 (1.22)
	Combined	1.68 (.95)	1.91 (.81)		Combined	2.52 (.98)	1.22 (.94)	

Note: Means linked by a bar are significantly different from each other.

by restraint interaction, $F(1, 72) = 14.27, p < .001, \eta_p^2 = .17$. Table 2 shows the means and standard deviations for chocolate consumption by restraint group, model size, and message valence. Among participants with high restraint, those exposed to the thin model consumed significantly more squares of chocolate ($M = 2.53, SD = .95$) than those exposed to the overweight model ($M = 1.22, SD = .94$), $F(1, 78) = 19.96, p < .001, d = 1.40$. Among participants with low restraint, those exposed to the thin model ($M = 1.68, SD = .98$) did not consume significantly less than those exposed to the overweight model ($M = 1.91, SD = .81$), $F(1, 78) = .46, n.s.$

Discussion

The aim of this experiment was to investigate the effects of different types of images and messages about chocolate on young women's orientations towards the product and their immediate consumption of it. On theoretical and empirical grounds (Cartwright et al., 2007; Rodgers et al., 2011), we assumed that participants would hold ambivalent orientations towards this common foodstuff, and that these measures would be influenced by the images to which we exposed them, though the effects were expected to be strongest among those with high dietary restraint (Durkin et al., 2012; Mills et al., 2002). As predicted, images containing thin ideal models appeared to be influential in promoting approach motives. High restraint participants had higher approach scores than did low restraint participants, irrespective of model type or message; low restraint participants exposed to the thin models had higher approach scores than low restraint participants exposed to the overweight models. Avoidance and guilt scores did not vary as a function of image type or message, but there were clear differences between the restraint groups, with the high restraint participants scoring substantially higher than low restraint participants on both of these measures. When the participants were provided with an opportunity to eat some chocolate, those with high restraint who had been exposed to the thin models consumed the most.

The findings are consistent with our theoretical assumptions that orientations towards chocolate are ambivalent. This is most evident among the high restraint participants. These young women recorded higher levels of approach towards chocolate, but also higher levels of avoidance and higher levels of guilt. The low restraint participants tended to have lower scores but still registered moderate levels of approach, avoidance and guilt. The present findings extend those of Durkin et al. who had found, in a repeated-measures design, that participants exposed to a thin model + chocolate condition subsequently had increased avoidance, approach and guilt scores. Durkin et al. did not distinguish between low and high restraint participants, but suggested post hoc that the impact of exposure to thin models + chocolate should be more pronounced among the latter; the present results bear this out. In both that study and this, the thin model + chocolate condition appears to be the most provocative of heightened ambivalent orientations towards chocolate.

Durkin et al. (2012) did not include a measure of consumption. The present study did and found that females with high restraint exposed to the thin model condition ate more of the chocolate provided. The finding that the effect of exposure to thin ideal models on amount of chocolate eaten was most marked among the high restraint participants is consistent with several earlier reports that restrained eaters tend to consume more food after exposure to images of such models than do less restrained eaters (Mills et al., 2002; Monro & Huon, 2006; Strauss et al., 1994; Warren et al., 2005).

Why might images of thin ideal women with chocolate promote chocolate consumption among restrained eaters? On first sight, this appears paradoxical. However, Mills et al. (2002) have argued that 'restrained eaters are susceptible to a thin fantasy brought about by viewing ideal body images' (p. 1697). These researchers found that, after looking at very thin models, restrained eaters reported not only that they *desired* to be thinner but that they *perceived themselves to be thinner*. Mills and colleagues propose that this leads to a transient decrease in high restraint participants' dietary inhibitions. These women enjoy a self-enhancement or

inspirational effect from the image. Because this results in feeling that they are closer to reaching their ideal form, they experience a reduction in the pressure to maintain their regimens. In essence, if a person regards herself as having become thinner, she may feel that she can afford a temporary relaxation of eating restrictions. Our findings are broadly consistent with Mills et al.'s (2002) interpretation and suggest that the thin ideal-inspired fantasy that they identified in restrained eaters may even be able to accommodate the ostensibly challenging task of reconciling the desire to be thin with consumption of a notoriously calorie-dense sweet.

Although our findings are consistent with the view that exposure to thin ideal models with chocolate may disinhibit some young women's consumption, we cannot conclude that any resultant thin fantasy is unequivocally congenial. The fact that high avoidance and high guilt motives can be reported alongside high approach suggests otherwise.

The high restraint participants' approach scores were also high in the overweight model condition. This suggests that high restraint participants tend to be attracted to chocolate *per se*, even when it is visually associated with a body image that they seek to avoid. At the same time, they had high avoidance and guilt motives. This provides further indication that the high restraint participants' orientations and responses to both types of image are the most ambivalent and most fraught.

The experiment yields some surprising results with respect to the impact of written information in this context. Most notably, it does not appear to have much consequence. The only effect involving the messages was a two-way interaction of restraint group and message valence. Examining this, we found that the high restraint group did not appear to be affected by message, and their approach scores were high whether it was positive or negative. However, the low restraint participants who were exposed to the negative messages had significantly higher approach scores than those exposed to the positive messages. This outcome had not been predicted.

We speculate that this may be an example of reactance, which is a common response to advice aimed at altering health-related behaviours. Warnings not to eat something because it is 'bad for you' may have the contrary effect of promoting or releasing desire for the forbidden product (Bushman, 1998; O'Key & Hugh-Jones, 2010). Reactance could be more marked among the low restraint participants because they are generally less preoccupied with regulating their food intake and thus find external attempts to intervene in freely determined behaviour more jarring. Among high restraint participants, approach scores were high irrespective of whether the messages were positive or negative. We had expected that high restraint participants would be the most sensitive to this manipulation. Instead, it seems that the appeal of chocolate to women with high restraint outweighs even explicit messages about the weight-threatening and other potentially harmful consequences of the sweet. This is consistent with the findings of Urbaszat, Herman, and Polivy (2002) that restrained eaters were disinhibited both by the ingestion of 'forbidden foods' and by the prospect of having to diet (and forego forbidden foods) for a week. Recall again that the high restraint participants in the present study did also have higher avoidance scores, irrespective of condition: they wanted to avoid chocolate, and they wanted to consume it. That is, they experienced ambivalence.

Implications for advertisers and health campaigns

It is of considerable interest to discover how environmental stimuli, such as advertisements or health information, might impact on individuals' chocolate-related motives. Our focus in this study has been on short-term effects. These are important because eating decisions are often triggered by proximal stimuli and recent

events. It is also possible, though not tested directly here, that short term effects can become sustained or habitual, especially if the relevant influences are chronically available (e.g., such as thin model advertisements in magazines and other media aimed at young women).

From a chocolate advertiser's perspective, exploitation of young women's vulnerability to the thin ideal has some attractions. Especially among restrained eaters, this kind of imagery might be among the most conducive to temptation. However, it will also incur negative motives. Thus, these women in particular may sometimes seek to avoid chocolate, and will sometimes feel guilty about eating it. Advertisers may or may not place consumers' wellbeing high among their priorities but the crucial point is that a widely favoured strategy will induce mixed reactions.

From a health educator's perspective, our findings underscore a challenge that is already well recognised: it is very difficult to mitigate female consumers' interests in chocolate. At least with respect to the textual messages tested here, it does not appear to make much difference to orientations towards chocolate whether the theme is positive or negative. Some evidence emerges in the present results to suggest the possibility of reactance to the latter. However, we should stress that only 'fear'-type negative messages were employed (i.e., messages emphasising the threat of weight gain or other health-injurious consequences). A lot of evidence from the health education literature shows that the ways in which messages are framed can make a difference to their persuasiveness, but that this varies as a function of other factors, including participants' needs, beliefs and self-efficacy (Gallagher & Updegraff, 2012). With respect to influencing orientations towards and consumption of chocolate, much remains to be investigated.

Limitations and directions for future research

Although we interpret our findings that high restraint participants ate more chocolate when exposed to thin model advertisements as consistent with the thin ideal-inspiration hypothesis of Mills et al. (2002), it should be acknowledged that we did not measure participants' self-perceived and ideal body images. Mills et al. found that these participants were most vulnerable to imagery manipulations, perceiving themselves as thinner when exposed to thin models. It would be valuable to test whether similar effects on self-perception are obtained in the context of thin models + emotionally arousing foodstuffs, as in the present paradigm.

For related reasons, future research could usefully examine more directly the nature of participants' cognitions when exposed to the kinds of images used here. For example, in respect of the image type most commonly exploited by advertisers (the thin ideal), do females with high restraint reason that 'eating chocolate has done her (the model) no harm (and so I can have some)'? Or even that 'chocolate may help me in my efforts to attain that kind of body'? It is possible that some may entertain the prospect of compensatory adjustments: 'I can eat some chocolate and still get to look like that (though I may have to give up some other food later).' Suggestions along these lines are aired regularly in the popular media in articles about the 'health' or 'weight loss' benefits of eating chocolate (e.g., *Huffpost Healthy Living*, 2012). Whether this reflects the restraint status of the journalists themselves and/or contributes to the social cognitions of the audience is open to investigation. Comparisons with the cognitions of low restraint eaters, who may find the issue of eating chocolate less problematic, or less important to regulate, may indicate correspondingly less need of this kind of conditional reasoning to justify their choices.

Another possible limitation of the procedure in the present experiment is that we administered the Restraint Scale before any other tasks. Our reasoning, similar to Ahern, Field, Spoor, Bohon, and Stice (2010), was that we wanted to obtain restraint

scores before the participants had been affected by the exposure to food and images of food within the experiment. Memory for recent food consumption has been shown to affect cognitions about food and subsequent eating behaviour (Higgs, 2002). If participants had very recently responded to an opportunity to eat chocolate, then this could lead to responses to items in the Restraint Scale reflecting or even justifying that behaviour. However, it should be acknowledged that a more common practice in this field is to administer the Restraint Scale finally, to avoid the inverse risk that completing the scale could sensitise participants to eating concerns ahead of experimental tasks. Future research could examine the effects of order of administration.

The research here highlights the subjective ambivalence of participants dealing with chocolate and suggests that certain types of imagery could affect behaviour. These processes could be tested further under conditions in which the desire for chocolate is maximised. For example, restrained eaters deprived of chocolate for several days report high levels of craving for it and eat more when given an opportunity to do so, taking short cuts on other tasks in order to expedite access to chocolate (Polivy, Coleman, & Herman, 2005). Together with the present evidence, this suggests that ambivalence is resolved in favour of consumption when the provocation – such as perceived deprivation and/or illusory association with thin ideal models – is strong. Future research into the conditions that tip the individual from ambivalent motives to behavioural decisions will inform our understanding of consumption of this very popular but, for many, potentially troublesome food.

Another important factor associated with fluctuations in females' craving for chocolate is the menstrual cycle (Zellner, Garriga-Trillo, Centeno, & Wadsworth, 2004). This was not taken into account here but future research could usefully examine the possibility that the cognitive and affective impact of different images could be stronger at certain points in the cycle (e.g., onset of menstruation or around ovulation; cf. Hormes & Timko, 2011). It should not be overlooked that males also consume chocolate, although their cravings tend to be lower (Rozin et al., 1991). Examining their reactions to different image types in this context would be of intrinsic interest but would also provide a valuable comparison against which to test hypotheses about the factors influencing females' reactions.

How individuals interpret and respond to different types of messages about a food such as chocolate is clearly in need of further research. While cell sizes in the present study provided adequate power to detect significant two-way interactions, it cannot be ruled out that future studies with larger samples may reveal effects of message valence or more complex interactions involving this factor.

Conclusions

This study adds to earlier evidence that orientations towards chocolate are ambivalent (Cartwright & Stritzke, 2008) and that different motives can be influenced by exposure to different types of visual imagery involving female models (Durkin et al., 2012). The thin model + chocolate advertisement strategy is most likely to induce or heighten ambivalence. In addition to these motivational consequences, it is also likely to affect behavioural responses, encouraging immediate consumption, particularly among women with keen interests in dieting (high restraint eaters).

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