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Motivational dynamics underlying eating regulation in young and adult female dieters: relationships with healthy eating behaviours and disordered eating symptoms

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Objective: To investigate whether type of goals and motives underlying females' eating regulation are associated differentially with daily eating behaviours, dependent upon weight and age category.

Design: 99 late adolescent female dieters ($M_{\text{age}} = 18.94$) and 98 adult female dieters ($M_{\text{age}} = 45.06$), 23.6% of which were overweight, completed a questionnaire and a 7-day diary assessment. Descriptive analysis and path analysis were performed to investigate the research questions.

Main outcome measures: Healthy eating behaviours (HEHS), drive for thinness and binge eating symptoms (EDI).

Results: Appearance-focused and controlled eating regulation were positively related to disordered eating symptoms throughout the week. In contrast, autonomous and health-focused eating regulation were associated positively with healthy eating behaviours and were either related negatively or unrelated to disordered eating symptoms. Mean level differences in motivation and eating behaviours emerged according to age and weight status. However, the examined structural model was similar for late adolescent and adult dieters and only few differences emerged between normal-weight and overweight dieters.

Conclusion: Dieters' type of motivation helps to explain when eating regulation relates to healthy and disordered eating symptoms.

Keywords: motivation; eating regulation; eating disorders; healthy eating; self-determination theory

Eating regulation plays a central role in the lives of many women. Approximately 50% of adult women engage in eating regulation to lose weight and an additional 34% regulates eating behaviours to maintain weight (Serdula et al., 1999). Although overweight and obese women are much more likely to engage in eating regulation, also about 30% of normal-weight women report trying to lose weight (Serdula et al., 1999). Research evidence suggests that eating regulation is not as effective as is generally believed. For instance, dieting interventions aimed at weight loss are effective in the short term but fail to promote sustained weight loss (Mann et al., 2007; Wooley & Garner, 1991). Even more, dieting behaviours can have opposite effects. For instance, longitudinal studies indicate that self-declared dieters are, over time, at risk for developing binge eating symptoms (Stice, Davis,

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Miller, & Marti, 2008; Stice, Presnell, & Spangler, 2002) and might gain more weight compared to their non-dieting peers (Westerberg-Jacobson, Edlund, & Ghaderi, 2010).

In contrast to these pessimistic findings, at least some dieters succeed at successfully losing weight during a significant amount of time (Wing & Hill, 2001) and experimental studies indicate that dieting interventions can decrease binge eating in overweight (Goodrick, Poston, Kimball, Reeves, & Foreyt, 1998; Reeves et al., 2001) and normal-weight women (Stice, Presnell, Groesz, & Shaw, 2005). Given the high prevalence of eating regulation and the search for effective eating regulation interventions among overweight individuals (Mann et al., 2007), it is important to gain insight in the processes that help explain when and why eating regulation is (un)successful.

One critical factor that may explain (un)successful eating regulation concerns the type of motivation underlying eating regulation (Verstuyf, Patrick, Vansteenkiste, & Teixeira, 2012). Accordingly, the general aim of the current study was to investigate whether the type of motivation for eating regulation, as conceived from the Self-Determination Theory perspective (SDT; Ryan & Deci, 2000), is differentially related to healthy eating behaviours and disordered eating symptoms (i.e. binge eating symptoms and drive for thinness) in a group of late adolescent and adult women who declared they were currently on a diet.

Different types of motivation

SDT is a broad-band motivational theory on human functioning and well-being that has been under development for more than four decades (Deci & Ryan, 2000; Ryan & Deci, 2000; Vansteenkiste, Niemiec, & Soenens, 2010). Two different types of motivational dynamics have received attention within SDT, that is, (a) the type of goals individuals set for themselves and aspire in their lives, representing the direction or 'What' of behaviour and, (b) the motives individuals have for engaging in particular activities, representing the regulation or 'Why' of behaviour. Both aspects of motivation are directly relevant for eating regulation.

'What' of eating regulation

Clearly, self-declared dieters differ substantially in the types of goals they aim to achieve by their eating regulation, with some of them aspiring a more attractive body or striving to attain social approval and others pursuing a healthier lifestyle. Indeed, in Western society, beauty is often equated with thinness (Evans, 2003; Ogden, 2010). Exposure to images depicting the thin ideal can lead girls and women to feel dissatisfied with their body and to desire losing weight, even if they are in fact normal weight (Groesz, Levine, & Murnen, 2002). On the other hand, being overweight has substantial medical risks, amongst which a higher risk for cardiovascular diseases, metabolic syndrome and certain types of cancer (Haslam & James, 2005; Yusuf et al., 2005). Therefore, many individuals might engage in eating regulation to maintain or attain a healthier weight and fitness.

The distinction between health-focused and appearance-focused eating regulation is in line with the differentiation between goals with an intrinsic and extrinsic focus within SDT (Kasser & Ryan, 1993, 1996; Vansteenkiste, Soenens, & Duriez, 2008). Extrinsic goals are characterised by an outward focus, thereby being oriented towards outcomes

such as a desirable image, wealth, fame and power. In contrast, intrinsic goals, such as health, community contribution and personal development, are characterised by an inward orientation. Pursuing these goals would be more inherently satisfying and promote well-being (Vansteenkiste et al., 2008). Consistent with these claims, intrinsic, relative to extrinsic goal pursuit, has been found to be more inherently enjoyable (e.g. Sebire, Standage, & Vansteenkiste, 2009) and to relate positively to both general well-being (Dittmar, Bond, Hurst, & Kasser, 2014) and domain-specific well-being and behavioural persistence in domains as diverse as physical activity (e.g. Sebire, Standage, & Vansteenkiste, 2011), education (e.g. Vansteenkiste, Lens, & Deci, 2006) and health care (e.g. Niemiec, Ryan, & Deci, 2009).

Specifically in the domain of eating regulation, appearance-focused, relative to health-focused, eating regulation has been found to relate to less optimal outcomes. In a sample of adult female dieters, Putterman and Linden (2004) reported that appearance-focused dieters were more likely to use drastic dieting strategies (e.g. fasting) and to lose control over eating, while such behaviours were not reported by health-focused dieters. Further, in a sample of female adolescents, Verstuyf, Vansteenkiste, and Soenens (2012) found that appearance-focused (but not health-focused) eating regulation was related positively to binge eating symptoms. Together, these cross-sectional studies suggest that a focus on appearance underlying eating regulation can explain, at least partially, when eating regulation yields adverse outcomes.

'Why' of eating regulation

Apart from standing in the service of different goal-contents, eating regulation can also be regulated by different motives. Some dieters might choose to regulate their eating behaviours because they are deeply convinced of the personal relevance and significance of doing so, while others feel pressured to do so either from within or by others, such as their peers, parents or the media (e.g. Keery, Boutelle, van den Berg, & Thompson, 2005; McCabe et al., 2007). To capture these different types of motivation, in SDT, a distinction is made between controlled or pressured and autonomous or volitional motives (Deci & Ryan, 2000). Controlled motives can stem from pressures from others, for instance, when individuals regulate eating behaviours to please others, to avoid criticism, or to obtain weight loss-contingent rewards. Yet, a lot of dieters also pressure themselves into eating regulation because they feel ashamed or guilty about their weight or because they hope to garner a sense of self-worth through successful eating regulation. In contrast, autonomous motives are characterised by a sense of volition, which may stem from the valuation of the eating regulation to achieve personally important life goals or from the challenge or personal interest in regulating one's eating pattern.

Several studies have investigated the relation between autonomous and controlled motives underlying eating regulation and eating behaviours. In a sample of college students, Pelletier, Dion, Slovinec-D'Angelo, and Reid (2004) found that autonomous motives for eating regulation associated positively with healthier eating, whereas controlled motives for eating regulation associated positively with bulimic symptoms and negatively with healthy eating behaviours. In addition, this pattern of findings was replicated and extended in a group of patients at risk for coronary heart disease, with autonomous motives for eating regulation being associated with significant

improvements in healthy eating behaviours at 26 weeks, which was also reflected in improved weight and blood parameters (see also Otis & Pelletier, 2008; Pelletier & Dion, 2007). Finally, Strong and Huon (1999) found that controlled motives for eating regulation were related to more extreme and rigid dieting behaviours across five months in a large sample of female adolescents. Together, these studies highlight the importance of considering the types of motives underlying eating regulation for understanding when eating regulation is associated with beneficial and dysfunctional outcomes.

Is the 'What' any different from the 'Why' of eating regulation?

Goal content and motives represent two important dimensions of motivation (Deci & Ryan, 2000). For instance, people can pursue health and physical fitness for relatively more controlled motives (e.g. 'because the doctor has told me to') or because of relatively more autonomous motives (e.g. 'because I want to be able to play with my kids'). Previous studies have focused uniquely on either eating regulation goals (e.g. Verstuyf, Vansteenkiste, et al., 2012) or eating regulation motives (Pelletier & Dion, 2007). In the present study, both motivational processes were addressed and their independent contribution in predicting healthy eating behaviours and disordered eating symptoms was examined. This is an important issue because the goal-content distinction has been argued to be reducible to the motive distinction, such that extrinsic and intrinsic goals completely parallel controlled and autonomous motives (Carver & Baird, 1998; Srivastava, Locke, & Bartol, 2001). More technically, this would mean that (a) both sets of concepts would correlate perfectly and (b) there would be no unique contribution of goal contents in the prediction of outcomes after taking into account the type of motives.

With respect to the relation between both dimensions, past research in domains as diverse as personal strivings (Sheldon, Ryan, Deci, & Kasser, 2004), physical activity (Sebire et al., 2009, 2011) and materialistic pursuits (Gardarsdóttir, Dittmar, & Aspinall, 2009) has shown that both sets of concepts are distinct. That is, although intrinsic goals typically go hand in hand with more autonomous motives and extrinsic goals typically correlated with more controlled motives, there is not a one-to-one (i.e. perfect) association between both. With respect to the independent contribution of goal contents above regulations, the evidence so far has been mixed. For instance, Sheldon et al. (2004) reported in a series of four studies that intrinsic, relative to extrinsic, goal striving related uniquely to well-being beyond the autonomous and controlled motives underlying goal striving, while Sebire and colleagues (2009, 2011) found that goal contents yielded an independent association with exercisers' well-being, but not with their physical activity level. Given these mixed findings, we examined this issue, as far as we know for the first time, in the domain of eating regulation. That is, we investigated whether appearance-focused and health-focused eating regulation would yield a unique relation to healthy and disordered eating outcomes, even after taking into account autonomous and controlled motives underlying eating regulation.

The role of age and weight status

A final aim involved investigating whether age and weight status would play a role in these motivational dynamics. First, we examined mean-level differences (a) between late

adolescent and adult women and (b) between normal-weight and overweight women in terms of eating regulation motives and goals. Previous research indicated that younger girls are more vulnerable to socio-cultural pressures to be thin (Groesz et al., 2002) and more often focus on their appearance (Putterman & Linden, 2004). Also, SDT-based research has shown that, with age, people tend to display a more adaptive motivational profile, characterised by a reduced valuation of extrinsic goals in favour of intrinsic goals and being motivated less by controlled and more by autonomous motives (e.g. Sheldon & Kasser, 2001). A similar pattern of motivational dynamics was expected when comparing adolescent to adult dieters. Further, also normal-weight and overweight dieters might differ in terms of the type of motives underlying their eating regulation. Overweight individuals are evaluated more negatively in Western society due to the association of overweight with laziness and lack of self-control or will-power (Ogden, 2010). Therefore, overweight individuals might experience greater pressures to regulate their eating behaviours. On the other hand, because overweight dieters are at risk for several medical problems (Haslam & James, 2005), health goals might be more salient among overweight, compared to normal-weight individuals.

In addition to investigating mean-level differences as a function of age and weight status, we also examined whether age and weight group would alter (i.e. moderate) the hypothesised relations between motivation and eating behaviours. Such comparisons allowed us to address the question whether controlled motivation and appearance-focused eating regulation would yield a different pattern of correlates with disordered eating symptoms in adolescent, compared to adult, and overweight, compared to normal-weight, self-declared dieters. One possibility is that the experience of pressure would be good for at least certain dieters, perhaps especially those who are in need of change. Yet, given the presumed universal importance of autonomy in SDT (Deci & Ryan, 2000), we expected that motivational dynamics would yield similar correlates among adult compared to late adolescent and among overweight compared to normal-weight self-declared dieters.

Present study

The global aim of the present study was to investigate the role of different motivational dynamics in a heterogeneous group of self-declared dieters, thereby paying attention to both type of goals (i.e. health-focused relative to appearance-focused) dieters set for themselves as well as to the types of motives (i.e. autonomous relative to controlled) underlying dieters' eating regulation efforts. In line with previous studies, we expected that appearance-focused and controlled eating regulation would be positively related to drive for thinness and binge eating symptoms. Further, we expected that health-focused and autonomous eating regulation would be related to more healthy eating behaviours. Finally, we expected that, in spite of mean-level differences, the relationships between goals and motives and eating behaviours would be comparable across younger and adult dieters and across normal-weight and overweight dieters.

Participants were currently dieting to lose weight, either by themselves or as part of a commercial weight-loss program. Motives and goals for eating regulation were assessed at the onset of the study, while eating behaviours were assessed on a daily basis during seven consecutive days. Diaries are known to have high ecological validity, as dieters' experiences and eating behaviours are assessed within an everyday

context. Also, these measurements are less susceptible to measurement errors due to retrospective recall, as the time interval between the actual engagement in and assessment of dieters' experiences and behaviours is limited (Bolger, Davis, & Rafaeli, 2003).

Method

Sample and procedure

Female self-declared dieters aged 16–20 (late adolescent sample) and 35–55 (adult sample) were invited by bachelor students in psychology to take part in a diary study on their daily eating habits. Only participants who reported that they were currently on a diet to maintain or lose weight were eligible for participation in the study. Participants did not receive reimbursements for their participation.

In total, 197 dieters participated in the study, 99 (50%) of which being late adolescents ($M_{\text{age}} = 18.84$) and 98 of which being adult women ($M_{\text{age}} = 45.06$). Most participants (i.e. 67.6%) had a healthy weight, whereas 23.6% were overweight and 8.8% underweight. Given the small number of underweight dieters ($N = 16$) and the observation that underweight dieters scored significantly lower ($M = 4.50$; $F(2, 178) = 6.82$, $p < .001$) on intensity of dieting (scale 1–7) compared to normal weight ($M = 5.52$) and overweight dieters ($M = 5.57$), these participants were excluded from further analyses. Further, it was found that age and weight status were significantly intertwined ($\chi^2(1) = 17.27$, $p < .001$), such that, respectively, 89% and 61% of the adolescent and adult group were normal weight. As a result, most overweight dieters were adults (i.e. 81%) and only 19% of the overweight dieters were late adolescents.

Most participants were highly educated. In the group of adolescents, 75.5% were enrolled in higher education. The remaining adolescents were attending secondary school with 9.2% being enrolled in academic education, 7.2% in technical education, 2.1% in vocational education and 5.7% attending a specialist year after having finished a technical or vocational track. In the group of adult women, 59.1% had completed higher education, whereas 4.8, 10.8 and 9.6% had finished, respectively, the academic, technical or vocational track at secondary school. Only 4.8% of adult women had no or minimal secondary education.

Prior to participating in the diary study, informed consents were signed by participants and by one of the parents for under-aged participants. During this first visit, participants completed a battery of self-report questionnaires including items tapping into demographic information (e.g. age, education, height and weight) and measures of motivation for eating regulation (e.g. goals and motives). At the end of the first visit, participants were handed over a booklet of questionnaires which had to be filled out in the evenings before bedtime during seven consecutive days. Participants received an e-mail or text message each evening to help them remember to fill in the questionnaires. Finally, the students who recruited the participants visited them at home a second time at the end of the study to collect the diary questionnaires and to answer any remaining questions.

Measures

Demographic variables

Participants reported their age, educational level and height and weight. Based on self-reported height and weight, BMI was calculated with the formula [weight in

kg/(2*length in m)]. Participants with a BMI between 18.50 and 24.99 were categorised as normal-weight (68%), whereas participants with a BMI of at least 25 were categorised as overweight (24%; 8% missing).

Eating regulation goals

Consistent with previous work (Verstuyf, Vansteenkiste, et al., 2012), two types of goals for eating regulation were assessed, that is, the intrinsic goal of physical fitness and health (three items) and the extrinsic goal of physical appeal and beauty (three items). After reading the stem 'I regulate my eating behaviours because...', participants indicated on a 7-point Likert scale ranging from 1 (*not at all important*) to 7 (*very important*) how strongly they valued each of the eating regulation goals. An example of health-focused eating regulation is 'because I want to keep fit', whereas an example of physical appearance-focused eating regulation is 'because I want to be thinner to look more attractive'. Cronbach's alpha was .83 and .79 for health-focused and appearance-focused eating regulation, respectively.

Eating regulation motives

Eating regulation motives were assessed with the self-regulation questionnaire (SRQ; Levesque et al., 2007; Ryan & Connell, 1989). The SRQ refers to a battery of questionnaires which assess domain-specific differences in autonomous and controlled motivation (e.g. school, sports, treatment). Each questionnaire asks why the respondent engages in a specific behaviour and then provides specific reasons representing the different types of motives for activity engagement. Similar to Pelletier et al. (2004), participants were presented with the sentence 'I regulate my eating behaviours because ...', followed by 16 items reflecting intrinsic (e.g. 'Because I enjoy regulating my eating behaviours'), identified (e.g. 'Because regulating my eating behaviours fits in with what I find truly important in life'), introjected (e.g. 'Because only then I can feel good about myself') and external motives (e.g. 'Because others would like me more'). Items were rated on a 5-point Likert scale, ranging from 1 (*Completely disagree*) to 5 (*Completely agree*). As in previous studies (Otis & Pelletier, 2008), a composite score for autonomous motivation was calculated by averaging the items for intrinsic and identified motivation ($r = .60$; $\alpha = .89$). A score for controlled motivation was calculated by averaging the items for introjected and external motivation ($r = .55$; $\alpha = .84$).

Healthy eating behaviours

To measure healthy eating, six items from the Healthy Eating Habits Scale (HEHS; Pelletier & Dion, 2007) were selected. This scale was constructed in collaboration with nutritionist and measures people's healthy food consumption. Participants filled in these items on a daily basis during seven consecutive days, with item responses varying between 1 (*not at all*) and 5 (*a lot*). Item examples are: 'Today I ate vegetables' and 'Today I ate a variety of foods as recommended in the food pyramid'. An average score on healthy eating behaviours was created by aggregating the scores across days within individuals. Cronbach's alpha was .69.

Drive for thinness and binge eating symptoms

Drive for thinness and binge eating symptoms were assessed with the drive for thinness and bulimia subscales of the Eating Disorder Inventory (EDI; Garner, 1991). All items were filled out on a daily basis on a scale from 1 (*never*) to 6 (*always*). Drive for thinness (seven items) refers to an excessive concern with eating, preoccupations with weight and fear of weight gain. Items were adjusted such that they tapped into concerns during the past day (e.g. Verstuyf, Vansteenkiste, Soenens, Boone, & Mouratidis, 2013). An example item is '*Today I was terribly scared to gain weight*'. Cronbach's alpha of the average score was .90. The bulimia subscale (seven items) assesses 'the tendencies to think about and engage in bouts of uncontrollable overeating' (Garner, 1991, p. 5). One item was not included in the computation of the scale score (i.e. '*I have thought of trying to vomit in order to lose weight*') because we were mainly interested in binge eating symptoms rather than compensatory bulimic behaviours. An example item is '*Today I had episodes of eating in which I felt like I cannot stop eating*'. Cronbach's alpha was .90.

Analytical plan

Prior to investigating the main research questions, bivariate correlations between study variables were calculated. Further, means and standard deviations for the different outcomes as a function of age and weight status were reported. A MANOVA was performed to investigate whether significant mean-level differences in study outcomes emerged according to age and weight group.

Second, manifest path analyses were used to investigate structural relationships between the study outcomes. In each model, we controlled for relevant background variables, that is educational level, BMI and age. Model fit was assessed using the chi-square statistic, the root-mean-square error of approximation (RMSEA), the standardised root-mean-square residual (SRMR) and the comparative fit index (CFI). Combined cut-off values of .08 or lower for the RMSEA, and .09 or lower for the SRMR indicate a good model fit (Bentler, 1990; Hu & Bentler, 1999). In addition, a CFI with values of .90 or higher reflects an acceptable fit (Bentler, 1990). In all models, we relied on the principle of parsimony, meaning that the simplest model was preferred over more complex models. To directly compare models, Difference-In-Chi-Square Tests were performed. If a simpler model did not result in a significant worse fit to the data, this model was preferred over the more complex model.

We began with examining the relationships between goals and motives and eating behaviours. Then, multi-group modelling was used to test whether structural relationships differed according to age group and weight status. Models in which structural relationships were set equal across groups (i.e. constrained model) were compared to models in which structural relationships were allowed to vary across groups (i.e. free model). Again, a chi-square difference test was used to evaluate whether the fit deteriorated if structural paths were constrained across groups.

Results

Preliminary analyses

Bivariate correlations between the measured variables can be inspected in Table 1. The two eating regulation goals (i.e. appearance-focused and health-focused) were positively

Table 1. Means, standard deviations (SD) and bivariate correlations between study variables.

	Mean	SD	1	2	3	4	5	6
1. Health-focused eating regulation	5.79	1.05	1					
2. Appearance-focused eating regulation	5.07	1.29	.28***	1				
3. Autonomous motivation	3.79	1.32	.31***	.11	1			
4. Controlled motivation	3.19	1.10	.03	.43***	.18*	1		
5. Healthy eating behaviours	2.72	0.59	.22**	-.02	.24**	-.10	1	
6. Binge eating symptoms	1.29	0.54	-.12	.12	-.14	.20*	.03	1
7. Drive for thinness	3.55	1.20	.07	.34***	-.05	.38***	.15	.47***

* $p < .05$; ** $p < .01$; *** $p < .001$.

interrelated and so were the two regulatory styles (i.e. autonomous and controlled). Further, health-focused eating regulation was associated positively with autonomous motivation, whereas appearance-focused eating regulation was associated positively with controlled motivation. Yet, these associations were of moderate size, providing initial evidence that the ‘What’ and ‘Why’ of eating regulation represent distinct motivational dynamics. Correlations between the motivational constructs and the outcomes were in line with hypotheses.

Primary analyses

Mean-level differences as a function of age and weight status

Table 2 presents means and standard deviations for the motivational measures and the different outcomes as a function of age group and weight status. A MANOVA revealed a significant multivariate effect of age group ($F(8153) = 5.27, p < .001$) and weight status ($F(8153) = 5.20, p < .001$) on the study variables. No significant multivariate interaction effect between age and weight group was found ($F(8, 153) = 3.19, ns$). As for age effects, as can be noticed in Table 2, adolescents, when compared to adults, reported significantly more appearance-focused eating regulation and controlled motivation, whereas they reported less health-focused eating regulation and autonomous motivation. As for weight status, normal-weight dieters scored higher on autonomous motivation compared to overweight dieters. Although only marginally significant, there was a trend for normal-weight dieters to score higher on health-focused eating regulation and lower on controlled motivation compared to overweight dieters. Further, normal-weight dieters scored lower on binge eating symptoms and drive for thinness compared to overweight dieters.

Associations between eating regulation goals and motives and eating outcomes

In a first model, all structural paths between goals and motives and eating outcomes were allowed. Several unique contributions of both the ‘What’ and ‘Why’ of eating regulation emerged. As for goals, health-focused eating regulation was associated positively with healthy eating behaviours and negatively with binge eating symptoms, whereas appearance-focused eating regulation was associated positively with drive for thinness and (marginally) positively with binge eating symptoms. As for motives,

Table 2. Means and standard deviations of the measured variables as a function of age group and weight status together with ANOVA results for age group and weight status effects.

	Total <i>N</i> = 76	Normal weight <i>N</i> = 68	Overweight <i>N</i> = 8	<i>F</i> (1, 160)	Age group effects Effect size
Late-adolescents					
Health-focused eating regulation	5.68	5.75	5.00	9.56**	.06
Appearance-focused eating regulation.	5.48	5.50	5.29	4.48*	.03
Autonomous motivation	3.55	3.67	2.56	9.91**	.06
Controlled motivation	3.32	3.23	4.06	4.82*	.03
Healthy eating behaviours	2.69	2.70	2.58	0.62	.00
Binge eating symptoms	1.31	1.29	1.44	0.58	.00
Drive for thinness	2.49	2.46	2.72	0.10	.00
Total		Normal weight	Overweight	Weight status effects	
	<i>N</i> = 88	<i>N</i> = 53	<i>N</i> = 35	<i>F</i> (1, 160)	Effect-size
Adults					
Health-focused eating regulation	6.03	6.04	6.01	3.64+	.02
Appearance-focused eating regulation	4.92	5.13	4.62	2.10	.01
Autonomous motivation	4.03	4.24	3.70	9.05**	.05
Controlled motivation	3.14	3.15	3.14	3.27+	.02
Healthy eating	2.72	2.71	2.72	0.35	.00
Binge eating symptoms	1.27	1.17	1.44	5.74*	.04
Drive for thinness	2.42	2.00	3.06	13.56**	.08

Note: Effect sizes are partial eta squared.
 + $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

autonomous motivation was associated positively with healthy eating behaviours, whereas controlled motivation was associated positively with drive for thinness. The final model, in which non-significant paths were excluded, is presented in Figure 1 and had an excellent fit ($\chi^2_{(6)} = 8.04, p = 0.24, RMSEA = 0.05, SRMR = 0.03, CFI = 0.99$).

Do relationships differ according to age group and weight status?

To examine whether structural relationships in the final model were similar across adolescent and adult dieters, a multi-group comparison was performed with age category as the moderating variable. The model in which all relationships were allowed to vary across adolescent and adult dieters was compared with the model in which structural relationships were constrained. The constrained model did not result in a significantly worse fit to the data ($\Delta\chi^2_{(6)} = 8.02, p = 0.20$). Therefore, the structural relationships presented in Figure 1 can be considered equal across age groups.

Second, a multi-group comparison with weight group as moderating variable was performed. A model in which all relationships were allowed to vary across normal-weight and overweight dieters was compared with a model in which structural relationships were constrained. The constrained model resulted in a significantly worse fit to the data ($\Delta\chi^2_{(6)} = 15.01, p < .05$). Further looking into the structural relationships within the normal-weight and overweight group separately, it was found that all relationships were similar across both groups, except for the paths from motivation to healthy eating behaviours. That is, in the normal-weight group, health-focused eating regulation was unrelated to healthy eating behaviours ($\beta = 0.10, p = 0.26$), whereas an autonomous motivation was positively related to healthy eating behaviours ($\beta = .30, p < .01$). In the overweight group, however, health-focused eating regulation was positively associated with healthy eating behaviours ($\beta = .40, p < .001$), whereas an autonomous motivation was unrelated to healthy eating behaviours ($\beta = -.08, p = 0.56$). In line with these observations, the unconstrained model was compared with a model in which structural relationships were constrained between the normal-weight and overweight group, except for the two paths to healthy eating behaviours. This constrained model did not result in a significant worse fit to the data compared to the unconstrained model ($\Delta\chi^2_{(4)} = 7.32,$

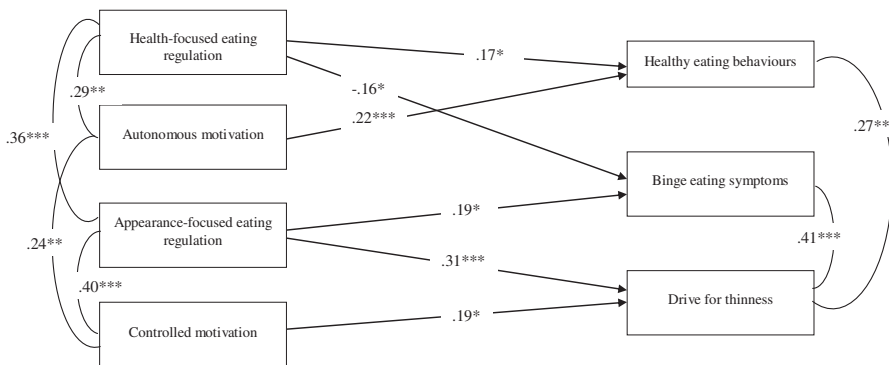


Figure 1. Structural relationships between eating regulation goals and motives and eating behaviours.

$p = 0.12$). Therefore, the structural relationships presented in Figure 1 can be considered equal across weight groups, except for the paths from motivation to healthy eating behaviours.

Discussion

In Western cultures, eating regulation is quite common among both normal-weight and overweight women (Serdula et al., 1999). Unfortunately, eating regulation is not without risks and previous research has indicated that eating regulation predicts both more disordered eating symptoms as well as more healthy eating behaviours (Mann et al., 2007; Stice et al., 2005, 2008). Herein, we examined whether the mixed set of correlates associated with eating regulation could possibly be explained by the motivational dynamics underlying self-declared dieters' eating regulation attempts. Indeed, to provide motivational support to dieters and to formulate advice about healthy ways of eating regulation, it is important to investigate when eating regulation is successful and when it relates to adverse outcomes (Groesz & Stice, 2007). Specifically, in the current study, we focused on both the type of goals adolescent and adult female dieters set for themselves (i.e. 'What' of eating regulation) and the motives for paying attention to their eating regulation pattern (i.e. 'Why' of eating regulation). It was found that goals and motives had several unique associations with eating behaviours. In general, health-focused eating regulation and autonomous motives were associated with more healthy and less disordered eating behaviours, whereas the reverse pattern was found for appearance-focused eating regulation and controlled motivation. Second, it was found that adolescent as well as overweight dieters displayed a more dysfunctional motivational style for eating regulation compared to adult and normal-weight dieters. Finally, structural relationships were found to be equal among adolescent and adult dieters and to be generally similar between normal-weight and overweight dieters. These findings are discussed in detail below.

Both goals and motives matter

Dieters can vary strongly in the type of motivation underlying their eating regulation efforts. Indeed, some dieters mainly focus on altering their appearance in the service of being more attractive, while others focus on developing a healthier lifestyle through their dieting. In addition, dieters might feel relatively more controlled versus autonomous in pursuing these goals. Within SDT, it is maintained that these two motivational dimensions are relatively distinct (Deci & Ryan, 2000). For instance, dieters could aim to achieve nicer looks to fit in and to receive positive comments from others (controlled motives) or because they personally value their looks (autonomous motives). Similarly, dieters could be focused on their health because their doctor expects them to take better care of their eating pattern (controlled motives) or because they have come to fully endorse the benefits associated with a healthier lifestyle (autonomous motives). Consistent with the presumed distinctiveness between the 'What' and 'Why' of eating regulation, the present findings showed that both dimensions were only moderately correlated. Specifically, health goals appeared to be regulated more autonomously, while appearance goals were regulated in a more controlled way. This finding indicates that the content of dieters' goals cannot be reduced fully to the volitional and pressuring

nature of eating regulation. Similar findings in the domain of exercising (Sebire et al., 2011) and personal strivings (Sheldon et al., 2004) have been reported.

Next, both the goals and the motives underlying eating regulation were found to yield unique associations with healthy eating behaviours, drive for thinness and binge eating symptoms. In general, health-focused and autonomous eating regulation were associated with positive outcomes and appearance-focused and controlled eating regulation were associated with adverse outcomes. Specifically, appearance-focused eating regulation was positively related to binge eating symptoms and drive for thinness, even after partialling out the effects of controlled motivation. This finding suggests that the detrimental effect of appearance-focused eating regulation cannot be explained away by the fact that people who adopt appearance-focus goals typically do so for relatively more pressuring reasons. Similarly, health-focused eating regulation was associated with healthy eating behaviours and binge eating symptoms even when autonomous motivation was controlled for. These findings suggest that a focus on health yields an independent value beyond the fact that people with a focus on health typically engage in eating regulation for autonomous reasons. These results are in line with Sheldon et al. (2004), who also found unique associations of goals on several well-being outcomes after controlling for the motives. In other words, the results of the current study contradict the statement that the goal-content distinction would be reducible to the motive distinction (Carver & Baird, 1998) and underline the importance of considering both the goals and the motives underlying behavioural regulation. Still, given that this study is among the first to examine the independent contribution of goals and motives in eating outcomes and given that others (e.g. Sebire et al., 2009, 2011) have found opposite evidence in other domains (e.g. the domain of physical activity), more research is needed to fully understand the unique role of goals and motives on outcomes. For instance, Sebire et al. (2009, 2011) found that goals yielded an independent contribution over motives in the prediction of general well-being, whereas no unique associations was found for physical activity behaviour, either self-reported or objectively recorded. Importantly, Sebire et al. (2009, 2011) used composite scores of intrinsic and extrinsic goals instead of examining specific goals (i.e. health, appearance), as was done in the current study. Perhaps, depending on the domain (i.e. eating regulation or physical activity), specific goals may carry more predictive power for the prediction of behavioural outcomes. Further research could look into this hypothesis, thereby considering both composite scores and its facets.

Age and weight status: a different motivational profile?

Do adolescent and adult dieters and normal-weight and overweight dieters differ in terms of their motivational profile? We found that adolescent dieters, compared to adult dieters, and overweight dieters, compared to normal-weight dieters, had a more dysfunctional motivational profile. First, adolescent dieters' eating regulation was driven more often by pressures rather than by individually endorsed goals and feelings of enjoyment and challenge. Adolescent dieters also focused more strongly on appearance goals and less on health compared to adult dieters. These results are consistent with previous studies indicating that younger women are more vulnerable to socio-cultural pressures to be thin and body image concerns (Groesz et al., 2002) and that younger people are oriented more generally towards controlled motives and

extrinsic goals compared to older people (Sheldon & Kasser, 2001). Second, there was a trend for overweight dieters to report more pressures for eating regulation and less autonomous motives. The finding that overweight individuals report more pressures is not surprising. Indeed, stigmas about overweight are highly prevalent in Western societies and, oftentimes, overweight individuals are individually blamed for being overweight (Ogden, 2010). Perhaps more surprisingly, overweight individuals also valued eating regulation less in terms of their health. One could expect health-focused eating regulation to be heightened in overweight individuals because they are more at risk for developing health problems (Haslam & James, 2005). Perhaps, the pressures associated with eating regulation in overweight individuals evoke a sense of reactance, such that overweight dieters in time give up or rebel against the 'dieting culture' and its obsession with health. Indeed, research in other life domains has shown that when individuals feel pressured and coerced, they are likely to rebel against the source of the pressure (e.g. Vansteenkiste, Soenens, Van Petegem, & Duriez, 2014). Research specifically in the domain of health management has shown that people are more likely to adopt advice concerning health if the advice is communicated in an autonomy supportive rather than in a controlling fashion (Pavey & Sparks, 2010).

In spite of the mean-level differences between normal-weight and overweight dieters, associations between the motives and goals for eating regulation and the outcomes were strikingly similar for both groups. The only differences that were found between normal-weight and overweight dieters were that an autonomous motivation was more beneficial with regards to healthy eating behaviours for the normal-weight group, whereas health-focused eating regulation was more beneficial for healthy eating behaviours in the overweight group. Thus, in spite of being less oriented to the goal of health, especially overweight individuals seem to benefit from doing so. Intuitively, one might argue that experiences of pressures for eating regulation might be less detrimental or even benign when people are overweight. Indeed, overweight and obesity are major societal problems and feeling pressured to adopt a healthier lifestyle could prevent people from becoming overweight. However, in the current study, we found that controlled motivation and appearance-focused eating regulation were not related to healthy eating behaviours (but rather to drive for thinness and binge eating symptoms), even among overweight people.

Further, controlled motivation and a focus on appearance were equally detrimental in groups of young and adult dieters. In other words, perceived pressures and appearance-focused eating regulation seemed to carry a cost for everyone. Given that younger and overweight dieters already have a more dysfunctional motivational profile and given that the poor quality of motivation is related to more disordered eating symptoms, it is important that health care providers are aware of the motivational dynamics in these groups such that they do not put additional pressures on individuals to regulate their eating behaviours.

Limitations and suggestions for future research

The current study had a number of limitations. First, although the sample was quite diverse in terms of age, the number of overweight women was limited, precluding the opportunity to investigate differences between overweight adolescent dieters and adult

dieters. Further, future studies could also include underweight participants to investigate whether the findings obtained would also generalise to underweight dieters. Possibly, outcomes other than binge eating symptoms, such as drive for thinness, rigid dieting and restrictive eating patterns are more salient in the latter population.

Second, the use of a day-to-day measurement was chosen because of a number of advantages. To prevent dropout and to increase chances that participants filled in the diaries each evening, we asked students to send text messages or e-mails each day to remember participants to fill in the questionnaires. However, we have not added a check on whether participants indeed filled in these questionnaires at evenings. Therefore, it cannot be assured that participants filled in the diaries at evenings as asked.

Third, dieters were followed during a short amount of time (i.e. a single week, yet on a day-to-day basis). It would be interesting to investigate the role of goals and motives for eating regulation on long-term changes in eating outcomes and weight. Ideally, such longitudinal studies would include assessments of all constructs at every time point, thus allowing for an examination of the possibility that there exist reciprocal associations between motivational constructs and eating outcomes. For instance, an episode of binge eating may not only follow from controlled motives but may also elicit feelings of control, such that people pressure themselves more to engage in a rigid diet, thus strengthening their controlled motivation.

Fourth, it would be interesting to investigate the relationships between known risk factors for disordered eating behaviours and motivation. For instance, people with an emotional eating style are known to be more vulnerable for binge eating after distressing events (e.g. Loxton, Dawe, & Cahill, 2011; Wallis & Hetherington, 2009). Perhaps, dieters with more controlled motives and appearance-focused eating regulation are more likely to have or to develop an emotional eating style, which in turn might explain why they display more disordered eating behaviours.

Clinical implications

Although the study had a number of limitations, the results also yield important clinical and even societal implications. In current society, the increase in overweight and obesity is reaching epidemic proportions. This is alarming, especially given the high cost of obesity in terms of health and quality of life (Haslam & James, 2005). Not surprisingly, health care providers warn people for the health costs of their obesity. To persuade people to regulate their eating behaviours, some health care providers might even point to the influence of overweight on attractiveness, especially with adolescent overweight individuals. Although well-meant, the current study indicates that eliciting a pressured form of regulation or orienting dieters to attractiveness goals might backfire, such that pressured dieters and dieters focused on attractiveness experience more binge eating symptoms and, thus, over time might even gain rather than lose weight (Masheb, White, & Grilo, 2013). Rather than pressuring overweight individuals to regulate eating behaviours, one could explore, from the perspective of the patient, which effects eating regulation could have in terms of individually endorsed life goals. Health care providers could also try to increase the level of enjoyment and challenge experienced during eating regulation.

Conclusion

Eating regulation efforts are highly prevalent among women in Western society. Despite this high prevalence, research indicates that eating regulation is not always effective and might even backfire into disordered eating behaviours. The current study underscores the importance of considering dieters' type of motivation. That is, not eating regulation in itself, but rather the type of motives and goals underlying eating regulation related to healthy eating behaviours and disordered eating symptoms. These findings are in line with previous studies demonstrating the importance of goals or the importance of motives in predicting eating outcomes. More research is needed to examine longitudinal associations between motivation and eating outcomes and to investigate relationships between motivation and other risk factors for disordered eating behaviours.

Disclosure statement

No potential conflict of interest was reported by the authors.

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