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Health and Appearance Reasons for Weight Loss as Predictors of Long-Term Weight Change

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Health and appearance reasons for weight loss as predictors of long-term weight change

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Abstract

This study investigated whether women's initial reasons (health, appearance to others, or appearance to self) for wanting to lose weight influenced their weight change over a 30-month web-based intervention. Multilevel modeling with 1416 observations revealed that only appearance in relation to one's self was a significant (negative) predictor. Women highly motivated to lose weight to improve their appearance in relation to themselves gained weight at 30 months, whereas those not motivated for this reason achieved clinically significant weight loss. Results suggest examining participants' initial reasons for weight loss as an important component of intervention failure or success.

Keywords

appearance, body image, females, health behavior, weight loss, women's health

Obesity is a challenging public health issue, as it is associated with chronic disease, reduced quality of life, higher rates of disability, and poor psychological health outcomes (Jensen et al., 2013). Despite the pressing public health concerns and amount of resources devoted toward reducing the rate of obesity, the proportion of obese adults in the US population continues to increase (Hales et al., 2017). Although it is important to foster healthy lifestyles and behavior change among overweight and obese individuals who do not have plans for losing weight, interest must also center on factors that inhibit success in people who are actively trying to reduce their weight. Because many individuals fail in their weight loss efforts (MacLean et al., 2015), it is important to gain insight into some of the factors responsible for the failure.

Populations are differentially affected by obesity, and women from rural areas in the United States are medically underserved, with an obesity rate of over 75 percent for older women (Folta et al., 2009). Obesity-related behaviors among rural women are attributed to a higher prevalence of late-life disability compared to men (Befort et al., 2012; Leveille et al., 2000). One reason for the high obesity rate among this population may be that women in rural communities often lack access to in-person weight loss or healthy eating preventive services such as professional

nutrition and physical activity counseling (Befort et al., 2012). Partially in response to the limited in-person services, researchers have recently turned toward the use of web-based behavioral change interventions with weight loss and weight maintenance as targets (Raaijmakers et al., 2015; Wieland et al., 2012). Despite the prevalence of web-based weight loss interventions, many studies use a combination approach whereby the web-based component supplements an in-person intervention (Brindal et al., 2012). Within rural locations, it can be difficult to conduct in-person interventions as both the facilities and number of available participants present logistical challenges (Hageman et al., 2017). The effectiveness of web-only interventions is less well known, although some evidence suggests that web-only interventions result in less weight loss and less weight maintenance when compared to in-person interventions (Raaijmakers et al., 2015; Wieland et al., 2012).

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Whereas there are many physiological and psychological benefits associated with weight loss, individuals may experience either positive or negative consequences during the process depending on the reasons or motives of *why* they initially decided to lose weight. Literature findings suggest that motivational factors are key psychosocial variables that influence long-term success in weight loss (Teixeira et al., 2004, 2012). For example, intrinsic reasons or motivation, such as an individual's interest in exercise, predicts long-term weight maintenance and the adoption of healthy behaviors (Santos et al., 2015; Silva et al., 2011). Reasons cited as extrinsic, such as appearance (Teixeira et al., 2012), are associated with binge eating and linked to negative weight loss outcomes (Vartanian et al., 2012).

Relatively few studies have explored the effect of the *initial* reason for weight loss on intervention outcomes such as actual change in weight, especially as observed over an extended period of time or within a population of midlife or older rural women (Elfhag and Rossner, 2005; Teixeira et al., 2012). As noted by Teixeira et al. (2012), behavioral interventions for weight loss typically focus on increasing or maintaining participants' level of motivation, with little attention paid to the nature or quality of that motivation. An appreciation of participants' initial reasons for considering weight loss interventions is important because in situations when an intervention fails or individuals experience poor outcomes, lack of participant readiness or motivation are often cited explanatory factors (Meyer et al., 2010).

A growing body of work examines the consequences of two primary types of goals for engaging in weight loss strategies: to improve one's health or to improve one's appearance. Health is a frequently cited reason for weight loss because obesity is largely seen as a health risk (Meyer et al., 2010; Putterman and Linden, 2004). Appearance goals have been related to a variety of negative outcomes such as high body dissatisfaction and low self-esteem (Thome and Espelage, 2007), heightened anxiety concerning their physiques (Strelan et al., 2003), and decreased psychological well-being (Maltby and Day, 2001). Indeed, individuals motivated to lose weight for appearance reasons versus health reasons were found to be more likely to use unhealthy eating strategies (Putterman and Linden, 2004), have higher concerns about body image (Vartanian et al., 2012), be more likely to binge eat (Schelling et al., 2011), and be more likely to engage in fat talk and unhealthy eating (Guertin et al., 2018). These negative effects are especially concerning given that body dissatisfaction may be among the primary factors motivating women and young adults to attempt weight loss (Holley et al., 2016; Vandervoort et al., 2015).

Meyer et al. (2010) recently developed a valid and reliable assessment of overweight and obese individual's reasons for weight loss across three factors. Health, being the desire to be healthier and live longer, was one factor. A second factor was the desire to improve one's appearance to

oneself, and individuals motivated by this factor want to lose weight to improve their body image. The third factor is to improve one's appearance in relation to others, interpreted as losing weight in order to have more friends, so that other people will be more accepting, and so on. The Meyer et al. (2010) scale is unique from other conceptualizations of health versus appearance reasons for weight loss because it distinguishes the appearance factor further into appearance in relation to one's self and appearance in relation to others. Findings from a cross-sectional study that used this scale suggest that appearance-based motives for losing weight can be associated with negative outcomes.

The primary purpose of this article was to explore whether rural women's initial reasons for wanting to lose weight (health, appearance to others, or appearance to self), influenced their change in weight over a 30-month web-based intervention. No previous study of weight loss motivations has focused solely on this population, which has high rates of obesity-related diseases and disability (Hageman et al., 2011). Furthermore, the web-based, longitudinal nature of the study is unique because, if successful, it may provide one avenue through which to combat obesity among rural women. Given previous work related to reasons for weight loss and various outcomes among women, we anticipate that women motivated for health reasons will lose more weight than those motivated for appearance reasons, but the effect of self- versus other-directed appearance motives is unclear.

The present study expands upon the existing literature in that it is one of few studies detailing the level and nature of the motivation among rural women to lose weight at the beginning of a clinical weight loss intervention as a predictor of their long-term weight change. This study contributes to the growing literature on web-based weight loss interventions, which is a context wherein participant motivation may be especially important to success. And, this study explores the relative impact of a participant's initial reason for wanting to lose weight on actual weight loss as opposed to self-reported weight loss, while examining appearance to others separate from appearance to self.

Method

Participants and procedure

This study included 301 women between the ages of 40 and 69 ($M = 53.94$, standard deviation (SD) = 6.88). Participants were primarily White (99%) and well-educated (41% with bachelor's degree or higher), and 53 percent reported annual household income of over US \$60,000. To be included in the study, participants were required to (a) live in a rural community, based on population density and working commuting patterns, (b) have a body mass index (BMI) of 28–45 kg/m², (c) be not taking any medications that affect weight, (d) be able to speak and read English, (e) be able to

use a computer and have access to the Internet and a DVD player, and (f) be willing to drive as many as 70 miles one-way to the research office. From the recruited sample, participants were excluded if they had diabetes type 1, or diabetes type 2 that required insulin, experienced weight loss of 10 percent or more within the prior 6 months, or if they were currently participating in any other weight loss intervention or research study (Hageman et al., 2011).

This study was a secondary analysis of clinical trial data collected as part of the Women Weigh-in for Wellness project that focused on three different web-based interventions promoting lifestyle modification for weight loss and weight maintenance for rural women. Informed consent was obtained from all participants, and we followed all ethical procedures necessary for human subjects research. The clinical trial is registered on clinicaltrials.gov with trial identifier: NCT01307644. More information on the project protocol and main effects can be found in other papers (Hageman et al., 2011, 2017).

Data were collected over a period of 30 months, with in-person measurements taken at baseline, 3, 6, 12, 18, 24, and 30 months. At the end of the 30 months, 236 participants had complete data and were included in this analysis. The intervention included three phases: Phase 1: baseline–6 months, guided weight loss; Phase 2: 6–18 months, guided weight management; and Phase 3: 18–30 months, self-directed weight maintenance. In general, the intensity of each intervention decreased as time progressed.

Measures

Motivation for weight loss. At baseline, participants completed the 24-item motivation for weight loss scale (Meyer et al., 2010). Participants read a series of statements with the stem “I want to lose weight ...” followed by a reason associated with one of three factors: health-related reasons, appearance in relation to others, and appearance in relation to self. Then, using a 4-point Likert-type scale, participants indicated how much they identified with each statement from 1 (*absolutely not*) to 4 (*strongly*). The health subscale ($\alpha=0.70$) consisted of 7 items such as “To be healthier” and “To decrease my health risks.” Appearance in relation to others ($\alpha=0.86$) was 10 items and included items such as “So I will be accepted by society,” “So that other people will think better of me,” and “To have more friends.” Appearance in relation to one’s self ($\alpha=0.90$) was 7 items, examples of which are “Because I want to like myself more,” “To feel more self-confident,” and “Because I want to be more attractive.”

Percent weight change. At 3, 6, 12, 18, 24, and 30 months, participants traveled to the research office where trained medical staff recorded their weight (kg). Percentage weight change was calculated at each point as the difference between the just-measured weight and the baseline weight.

Effects of time. Change over time was coded to allow us to model both the linear and curvilinear effects. The linear effect relates to an overall decrease or increase in weight across the study. However, given previous research on weight loss interventions, and the 3-phase (loss, management, and self-directed maintenance) design of the current study, we did not anticipate that participants would, on average, experience an equal amount of weight loss or gain as a function of a given time unit. Rather, participants in weight loss interventions typically lose weight rapidly, regain weight, and then, if the intervention is successful, end the study at weight lower than the baseline weight but higher than the lowest weight achieved early on (Jeffery et al., 2000). As such, we also coded weight to examine this curvilinear effect. Time was coded as 3 months: 0, 6 months: 0.13, 12 months: 0.25, 18 months: 0.50, 24 months: 0.75, and 30 months: 1. The curvilinear effect was the square of the linear time codes.

Covariates. Baseline age, BMI, and intervention group of participants were used as covariates. Two contrast codes were created to test the effects of the three intervention groups. One code compared web-only (–1) versus email (1), and the other code compared web-only (–1) versus discussion (1). Age and BMI are frequently controlled for in studies examining weight change because of the strong associations among the variables (Hageman et al., 2018; Hennecke and Freund, 2016).

Analytic approach

All hypotheses were tested using multilevel modeling (Scott et al., 2013) in the program HLM version 7.03 (HLM, 2018). Multilevel modeling was appropriate for these analyses as the weight change data were inherently nested within participants because participants were measured multiple times. Multilevel modeling, therefore, accounts for this data nesting and allows analyses to focus on *how* individuals changed over time, in addition to examining differences between participants.

Several multilevel models were estimated. Model 1 was an unconditional model that included only the dependent variable (percent change in weight). This model provided the proportion of variability, or the intra-class correlation, of percent change in weight within individuals and between individuals. Model 2 added the linear and curvilinear effects of time to the prediction of percent weight change. In Model 3, we added age, BMI, and intervention group as covariates as between-participants factors of the intercept, linear change over time, and curvilinear change over time. The curvilinear effect of time and the intercept were treated as random factors, meaning that the curvilinear effect of time and the final percent weight change were allowed to vary between participants. In Model 4, the effect of each reason for initial weight loss was added to all within-participant

Table 1. Descriptive statistics and correlations of between-participant variables.

Variable	M	SD	1	2	3	4	5	6
1. Age	53.94	6.88	–					
2. BMI	34.84	4.21	–0.06	–				
3. Group	–	–	–0.07	0.03	–			
4. Health reason	3.69	0.34	0.20*	0.02	–0.02	0.70		
5. Appearance to others	2.94	0.64	–0.11	–0.11	0.06	0.26**	0.86	
6. Appearance to self	1.68	0.63	–0.10	0.11	–0.03	0.23**	0.66**	0.90

SD: standard deviation; BMI: body mass index.

$N=236$. Estimates of internal consistency displayed on diagonal where appropriate. For group, 1 = web only, 2 = discussion, 3 = email.

** $p < 0.001$; * $p < 0.01$.

predictors. After each model was estimated, we compared model fit and the proportional reduction in prediction error to the previously estimated model (Snijders and Bosker, 1999). Before any models were estimated, we examined the data to ensure that assumptions of regression were not violated.

Results

Descriptive statistics and correlations among study variables are displayed in Table 1. Model 1 (the unconditional model) indicated that 27.78 percent of the variability in percentage of weight loss was at the within-participant level, whereas 72.22 percent of the variance was between individuals. The level 1 (within-participant) variability represented a significant portion of the total variability, $\chi^2_{(211)}=3213.98$, $p < 0.001$. Given the large amount of level-1 and level-2 variability, and the finding that the variability at level-1 was significant, the use of multilevel modeling was justified (Table 2).

In Model 2, the linear and curvilinear effects of change over time were added as random effects. The linear effect was significant ($b=-0.03$, standard error (SE)=0.01, $t_{(224)}=-2.31$, $p=0.02$), but the curvilinear effect was not ($b < 0.01$, SE=0.01, $t_{(224)}=0.19$, $p=0.85$). At the end of the study, participants weighed significantly less than their baseline weights. The linear and curvilinear change over time proportionally reduced prediction error (proportional reduction in prediction error [PRPE]=67.94%), which represented a significant improvement to the model of percentage weight loss ($\Delta\chi^2_{(5)}=567.02$, $p < 0.001$).

In Model 3, we began adding between-participant variables. First, we included the covariates as predictors of 3-month weight change (intercept) along with the linear and curvilinear effects of time. There was no effect of BMI or web versus discussion board, but age predicted both the linear ($b=0.03$, SE=0.01, $t_{(220)}=2.30$, $p=0.02$) and curvilinear ($b=-0.02$, SE=0.01, $t_{(222)}=-2.22$, $p=0.03$) effects of time, and web versus email predicted the linear effect of time ($b=0.03$, SE=0.02, $t_{(220)}=2.13$, $p=0.04$). For the linear effect, this indicates that older individuals tended to lose weight less rapidly than younger individuals, while

participants in the email counseling group lost weight more quickly than those in the web-only group. Adding the covariates slightly reduced prediction error of the intercept (PRPE=0.45%), linear change over time (PRPE=3.20%), and curvilinear change over time (PRPE=2.94%). The model of the intercept ($\chi^2_{(4)}=14.29$, $p=0.006$) and of the linear time effect was improved ($\chi^2_{(4)}=17.55$, $p < 0.001$), but the model of the curvilinear effect of time was not significantly improved ($\chi^2_{(4)}=9.89$, $p=0.07$).

Model 4 added the three reasons of motivation to lose weight as predictors of the intercept and the two effects of time. The “appearance to self” as an initial reason for weight loss was a significant predictor of linear change over time ($b=0.04$, SE=0.02, $t_{(217)}=-2.17$, $p=0.02$) and the curvilinear effect of time ($b=0.03$, SE=0.02, $t_{(217)}=2.04$, $p=0.04$). Likewise, PRPE was reduced somewhat for the intercept (PRPE=0.46%) and moderately for the linear (PRPE=3.49%) and curvilinear effects of time (PRPE=3.02%). Participants who were highly motivated for self-appearance reasons (1 SD above the mean) lost weight less rapidly (and actually gained weight on average) than moderately (mean) or less (1 SD below the mean) motivated participants. Results are depicted in Figure 1. The models for the three effects in the prediction of percent weight change were improved, $\chi^2_{(3)}=33.75$, 18.63, and 13.28, $p < 0.05$.

Discussion

Our study examined the association between women’s initial reason for weight loss and their change in weight after 30 months of participation in a purely web-based intervention. We found that only one factor, appearance in relation to oneself, was a unique predictor of weight change. Women who most strongly endorsed wanting to lose weight to improve their appearance to themselves gained weight, on average, after 30 months of participating in a weight loss intervention. Those who were moderately motivated for self-appearance reasons lost a marginal amount of weight (around 2%). Importantly, participants *least* motivated for this reason obtained clinically meaningful weight loss of at least 5 percent, which is necessary for obtaining health

Table 2. Multilevel model estimates.

Predictors	Model 2 (effects of time)		Model 3 (covariates)		Model 4 (final)	
	b (SE)	t (df)	b (SE)	t (df)	b (SE)	t (df)
Intercept	0.05 (0.01)	15.27 (224)*	0.05 (0.01)	15.01 (220)*	0.05 (0.01)	15.33 (217)*
Internet versus email group			<0.01 (0.01)	0.75 (220)	<0.01 (0.01)	0.63 (217)
Internet versus discussion group			<-0.01 (0.01)	-0.66 (220)	<-0.01 (0.01)	-0.47 (217)
BMI			-0.01 (0.01)	-1.56 (220)	<-0.01 (0.01)	-1.37 (217)
Age			<0.01 (0.01)	1.02 (220)	<0.01 (0.01)	1.00 (217)
Health reason					<0.01 (0.01)	0.53 (217)
Appearance to others					<-0.01 (0.01)	-0.06 (217)
Appearance to self					-0.01 (0.01)	-1.48 (217)
-PRPE %: $\chi^2_{(\Delta df)}$	67.94%	567.02 (5)	0.45%	14.29 (4)*	0.46%	33.75 (3)*
Change over time (linear)	-0.03 (0.01)	-2.31 (224)*	-0.03 (0.01)	-2.60 (220)*	-0.03 (0.01)	-2.91 (217)*
Internet versus email group			0.04 (0.02)	2.13 (220)*	0.03 (0.02)	1.90 (217)
Internet versus discussion group			-0.03 (0.02)	-1.83 (220)	-0.03 (0.02)	-1.57 (217)
BMI			<0.01 (0.01)	0.06 (220)	0.01 (0.01)	0.67 (217)
Age			-0.03 (0.01)	2.29 (220)*	0.04 (0.01)	3.00 (217)*
Health reason					-0.02 (0.01)	-1.60 (217)
Appearance to others					0.02 (0.02)	1.07 (217)
Appearance to self					-0.04 (0.02)	-2.31 (217)*
-PRPE %: $\chi^2_{(\Delta df)}$			3.20%	17.55 (4)*	3.49%	18.63 (3)*
Change over time (curvilinear)	<0.01 (0.01)	0.20 (224)	<0.01 (0.01)	0.48 (220)	0.01 (0.01)	0.66 (217)
Internet versus email group			-0.03 (0.02)	-1.84 (220)	-0.03 (0.01)	-1.67 (217)
Internet versus discussion group			0.03 (0.02)	-1.84 (220)	0.02 (0.01)	1.60 (217)
BMI			<0.01 (0.01)	0.48 (220)	<-0.01 (0.01)	-0.06 (217)
Age			-0.02 (0.01)	-2.22 (220)*	-0.03 (0.01)	-2.80 (217)
Health reason					0.03 (0.01)	1.29 (217)
Appearance to others					-0.01 (0.01)	-0.83 (217)
Appearance to self					0.04 (0.01)	2.04 (217)*
-PRPE %: $\chi^2_{(\Delta df)}$			2.94%	9.89 (4)	3.02%	13.28 (3)*

SE: standard error; BMI: body mass index; PRPE: proportional reduction in prediction error.

Model 2 is compared to the unconditional model that included no predictors of the dependent variable.

benefits of weight reduction (Stevens et al., 2001). Our findings are in line with other work suggesting that appearance-based motives for losing weight are associated with negative outcomes (Vartanian et al., 2012), and the results support and extend previous cross-sectional, retrospective, and self-report studies.

Implications and future directions

A number of implications and future directions stem from our findings. First, the initial reason a woman has for losing weight is predictive of her actual weight change 30 months later. When considering a woman's initial reason for weight loss discussed in the literature—health reasons, appearance to one's self, and appearance to others—only appearance to one's self predicted weight change. Although a robust amount of research examines factors that influence individuals to lose weight for appearance reasons, such as low self-esteem (Thome and Espelage, 2007) and poor body image (Vartanian et al., 2012), additional work should

explore interventions to promote more positive reasons for weight loss *prior* to beginning weight loss interventions.

Second, our findings indicate that among our rural sample of older women, health-related reasons for weight loss were not independent of appearance reasons. Indeed, there were positive associations between the two appearance factors and health, suggesting that women are highly likely to be motivated by a variety of reasons when deciding to pursue weight loss. This is important because the effect of even a moderately high endorsement of self-appearance as an initial reason for weight loss buffered the contribution of all other reasons on actual attainment of weight loss. The mean of the self-appearance factor was 1.68, meaning that women classified as “highly motivated” in this study (1 SD above the mean) scored only 2.31 out of 4.00 on the measure. Although our sample had few women who reported high or very high endorsement of self-appearance as an initial reason for weight loss, we postulate that individuals who highly identify with self-appearance as a reason for weight loss would be most

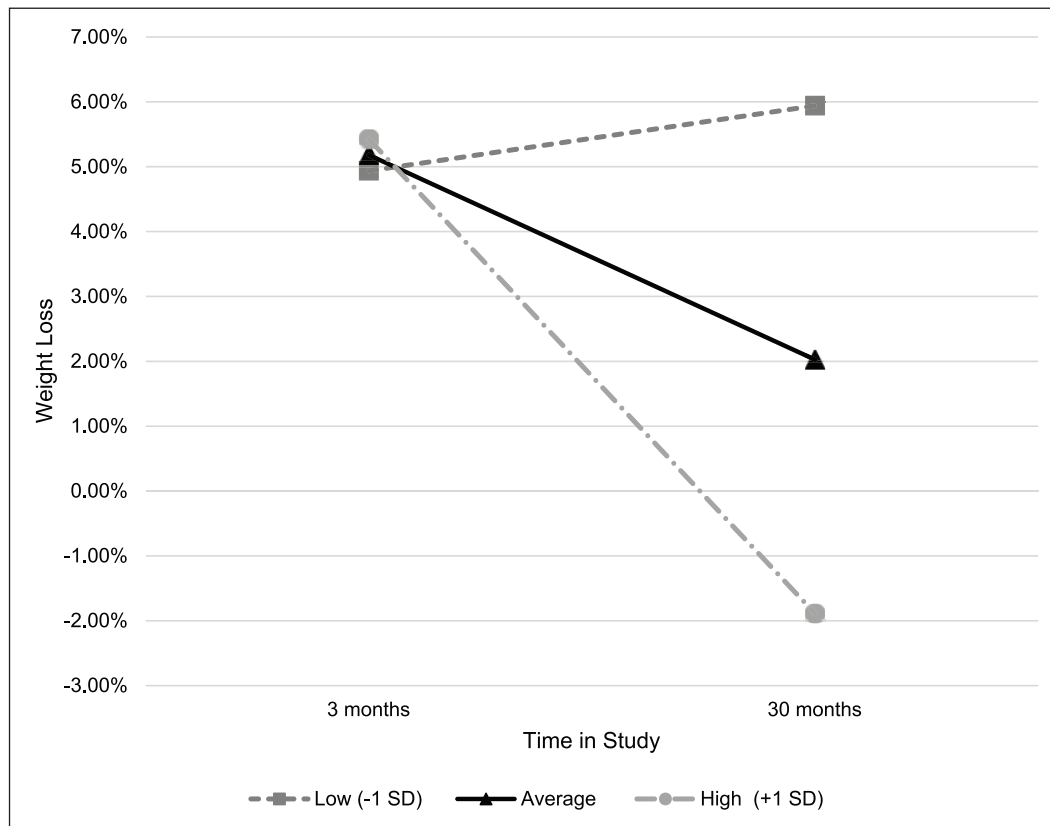


Figure 1. The effect of baseline motivation to lose weight for self-appearance reasons on weight loss at 3 months through 30 months. Women who were highly motivated on this factor at baseline gained weight, on average, 30 months later, whereas women minimally motivated by this factor lost 6 percent of their baseline weight. Effects are controlling for baseline BMI, age, other reasons for wanting to lose weight, and intervention group. Negative weight loss indicates weight gain relative to baseline weight.

likely to gain weight, as high identification weight self-appearance may indicate greater body dissatisfaction and a negative body image (Thome and Espelage, 2007). For example, it is possible that there is an inverted-u curvilinear effect such that a moderate amount of motivation for weight loss for self-appearance reasons is detrimental, but as motivation increases beyond that point, the negative effect diminishes. Future research might further explore the nature of this relationship.

Relatedly, one potentially fruitful area for future research could be to explore factors that influence women's reasons for *continuing* a weight loss intervention, rather than focusing solely on why women began the intervention. Continued interaction with components of the web-based intervention messaging may have influenced why women wanted to lose weight as they progressed through the study. We measured reasons for weight loss only at the beginning of the present intervention, but future work could measure it throughout, and examine whether a *change* in weight loss reasons may be especially beneficial for participants initially spurred to improve their own appearance via weight loss.

Third, our finding that women highly motivated for weight loss due to self-appearance reasons were the least successful in the intervention suggests that the reason for the motivation may be more important in general than the intensity of the motivation, as has been suggested by others (Teixeira et al., 2012). It is possible that high self-appearance motivation lead to an initial boost of engagement in the intervention among participants, but that slow changes in appearance, or less change than anticipated, contributed to lower engagement and disillusionment after 3 months. Similarly, found that a greater discrepancy between perceived and ideal body size was positively related to weight gain nearly 2 years later. In this study, we did not include measures of women's satisfaction with their appearance throughout, but future investigations should do so to more fully explore the mechanisms by which initial appearance for weight loss affects actual weight loss. One explanatory mechanism may be that participants motivated for self-appearance reasons are less autonomously motivated to exercise, which has been demonstrated to be a very important factor in long-term weight maintenance (Santos et al., 2015; Silva et al., 2011).

Limitations

Although we uncovered a robust series of relationships, some limitations must be considered before drawing any firm conclusions from our findings. Given the nature of the study, our sample was limited to rural, midlife, or older, largely White women. Potentially as a result of the inclusion criteria the sample was largely high income. As such, how well these findings generalize to other populations is unknown. There is some evidence that women are more likely to want to lose weight for appearance reasons compared to men (Crane et al., 2016; Tylka and Homan, 2015), and that younger adults may differ in the reasons for losing weight when compared to older adults (Lanoye et al., 2016; Rancourt et al., 2018). Although we propose some possible explanations for our findings, additional data are necessary to provide insight. For instance, it is possible that women who were highly motivated at baseline to lose weight for self-appearance reasons were enthusiastic at 3 months; yet their enthusiasm for the study dwindled as time progressed and appearance changes were not rapid or of the desired nature. Unfortunately, women in this study did not rate their satisfaction with their appearance, and this could be an outcome of interest in future studies.

Another limitation is that we are unable to account for other, confounding variables that may explain our results. For example, given the oftentimes individual and personal nature of weight loss, personality factors not captured in our work may jointly influence appearance for weight loss and, concurrently, other health-related behaviors. Likewise, a woman's relationship status (married, single, divorced, etc.) at the beginning of the intervention may influence the reason why she wants to lose weight. Perhaps, women are more motivated for appearance reasons when not married compared to when they are married. Relationship status may be an important factor to consider in future work. Another factor that may affect initial reasons for weight loss is whether someone has participated in previous weight loss interventions, specifically those with promoting weight loss as a means of achieving health benefits. We do not have this information for participants, but, given the rural location, it is unlikely many women participated in other studies. In addition, although we collected women's initial reasons for wanting to lose weight, we did not tailor the intervention to account for these factors, nor did we explore how specific features of the intervention may have differentially affected participants with varying motivational profiles.

Conclusion

This study investigated the association between women's initial reasons for wanting to lose weight with weight change over 30 months. Of three initial reasons for weight loss—health, appearance to others, and appearance to self—only

appearance to self uniquely predicted weight change in our longitudinal, multilevel modeling analysis. Women more highly motivated by appearance to self gained weight at the end of the intervention, whereas women who identified very little with this reason achieved clinically significant weight loss of at least 5 percent. Based on these findings, which contribute to a growing body of work on the impact of initial motivational factors on weight loss success, researchers should seek to incorporate and account for participants' reasons for trying to lose weight when designing and analyzing weight loss interventions. Furthermore, this study is unique in our focus on rural women who are midlife or older, and results are particularly relevant to improving health outcomes in this population.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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References

- Befort CA, Nazir N and Perri MG (2012) Prevalence of obesity among adults from rural and urban areas of the United States: Findings from NHANES (2005–2008). *The Journal of Rural Health* 28: 392–397.
- Brindal E, Freyne I, Saunders S, et al. (2012) Features predicting weight loss in overweight or obese participants in a web-based intervention: Randomized trial. *Journal of Medical Internet Research* 14: e173.
- Crane MM, Jeffery RW and Sherwood NE (2016) Exploring gender differences in a randomized trial of weight loss maintenance. *American Journal of Men's Health* 11: 369–375.
- Elfhag K and Rossner S (2005) Who succeeds in maintaining weight loss? A conceptual review of factors associated with weight loss maintenance and weight regain. *Obesity Reviews* 6: 67–85.
- Folta SC, Lichtenstein AH, Seguin RA, et al. (2009) The Strong Women-Healthy Hearts Program: Reducing cardiovascular disease risk factors in rural, sedentary, overweight, and obese midlife and older women. *American Journal of Public Health* 99: 1271–1277.
- Guertin C, Barbeau K and Pelletier L (2018) Examining fat talk and self-compassion as distinct motivational processes in women's eating regulation: A self-determination theory

- perspective. *Journal of Health Psychology*. Epub ahead of print 26 June 2018. DOI: 10.1177/1359105318781943.
- Hageman PA, Pullen CH and Yoerger M (2018) Physical function and health-related quality of life in overweight and obese rural women who meet physical activity recommendation. *Journal of Aging and Physical Activity* 26: 438–444.
- Hageman PA, Pullen CH, Hertzog M, et al. (2011) Web-based interventions for weight loss and weight maintenance among rural midlife and older women: Protocol for a randomized controlled trial. *BMC Public Health* 11: 521.
- Hageman PA, Pullen CH, Hertzog M, et al. (2017) Web-based interventions alone or supplemented with peer-led support or professional email counseling for weight loss and weight maintenance in women from rural communities: Results of a clinical trial. *Journal of Obesity* 2017: 1602627.
- Hales CM, Carroll MD, Fryar CD, et al. (2017) *Prevalence of obesity among adults and youth: United States, 2015–2016*. NCHS Data Brief, No 288, October. Hyattsville, MD: National Center for Health Statistics.
- Hennecke M and Freund AM (2016) Age, action orientation, and self-regulation during the pursuit of a dieting goal. *Applied Psychology: Health and Well-Being* 8: 19–43.
- HLM (2018). Computer software. Available at: <http://www.ssicentral.com/hlm/new.html>
- Holley TJ, Collins CE, Morgan PJ, et al. (2016) Weight expectations, motivations for weight change and perceived factors influencing weight management in young Australian women: A cross-sectional study. *Public Health Nutrition* 19: 275–286.
- Jeffery RW, Epstein LH, Wilson GT, et al. (2000) Long-term maintenance of weight loss: Current status. *Health Psychology* 19: 5–16.
- Jensen MD, Ryan DH, Apovian CM, et al. (2013) 2013 AHA/ACC/TOS guideline for the management of overweight and obesity in adults. *Circulation* 129(25 Suppl. 2): S102–S138.
- Lanoye A, Gorin AA and LaRose JG (2016) Young adults' attitudes and perceptions of obesity and weight management: Implications for treatment practice. *Current Obesity Reports* 5: 14–22.
- Leveille S, Resnick H and Balfour J (2000) Gender differences in disability: Evidence and underlying reasons. *Aging: Clinical and Experimental Research* 12: 106–112.
- MacLean PS, Wing RR, Davidson T, et al. (2015) NIH working group report: Innovative research to improve maintenance of weight loss. *Obesity* 23: 7–15.
- Maltby J and Day L (2001) The relationship between exercise motives and psychological well-being. *The Journal of Psychology* 135: 651–660.
- Meyer AH, Weissen-Schelling S, Munsch S, et al. (2010) Initial development and reliability of a motivation for weight loss scale. *Obesity Facts* 3: 205–211.
- Putterman E and Linden W (2004) Appearance versus health: Does the reason for dieting affect dieting behavior? *Journal of Behavioral Medicine* 27: 185–204.
- Raaijmakers LCH, Pouwels S, Berghuis KA, et al. (2015) Technology-based interventions in the treatment of overweight and obesity: A systematic review. *Appetite* 95: 138–151.
- Rancourt D, Jensen CD, Duraccio JM, et al. (2018) Successful weight loss initiation and maintenance among adolescents with overweight and obesity: Does age matter? *Clinical Obesity* 8: 176–183.
- Santos I, Mata H, Silva M, et al. (2015) Predicting long-term weight loss maintenance in previously overweight women: A signal detection approach. *Obesity* 23: 957–964.
- Schelling S, Munsch S, Meyer AH, et al. (2011) Relationship between motivation for weight loss and dieting and binge eating in a representative population survey. *International Journal of Eating Disorders* 44: 39–43.
- Scott JS, Simonoff MA and Marx BD (2013) *The Sage Handbook of Multilevel Modeling*. Thousand Oaks, CA: SAGE.
- Silva MN, Markland D, Carraca EV, et al. (2011) Exercise autonomous motivation predicts 3-yr weight loss in women. *Medicine & Science in Sports & Exercise* 43: 728–737.
- Snijders T and Bosker R (1999) *Multilevel Analysis: An Introduction to Basic and Advanced Multilevel Modeling*. London: SAGE.
- Stevens VJ, Obarzanek E, Cook NR, et al. (2001) Long-term weight loss and changes in blood pressure: Results of the trials of hypertension prevention, phase II. *Annals of Internal Medicine* 134: 1–11.
- Strelan P, Mehaffey SJ and Tiggemann M (2003) Brief report: Self-objectification and esteem in young women: The mediating role of reasons for exercise. *Sex Roles* 48: 89–95.
- Teixeira PJ, Carraça EV, Markland D, et al. (2012) Exercise, physical activity, and self-determination theory: A systematic review. *International Journal of Behavioral Nutrition and Physical Activity* 9: 78.
- Teixeira PJ, Going SB, Houtkooper LB, et al. (2004) Pretreatment predictors of attrition and successful weight management in women. *International Journal of Obesity* 28: 1124–1133.
- Thome JL and Espelage DL (2007) Obligatory exercise and eating pathology in college females: Replication and development of a structural model. *Eating Behaviors* 8: 334–349.
- Tylka TL and Homan KJ (2015) Exercise motives and positive body image in physically active college women and men: Exploring an expanded acceptance model of intuitive eating. *Body Image* 15: 90–97.
- Vandervoort J, Aimé A and Green-Demers I (2015) The monster in the mirror: Reasons for wanting to change appearance. *Eating and Weight Disorders* 20: 99–107.
- Vartanian LR, Wharton CM and Green EB (2012) Appearance vs. health motives for exercise and for weight loss. *Psychology of Sport and Exercise* 13: 251–256.
- Wieland LS, Falzon L, Sciamanna CN, et al. (2012) Interactive computer-based interventions for weight loss or weight maintenance in overweight or obese people. *Cochrane Database of Systematic Reviews* 8: CD007675.