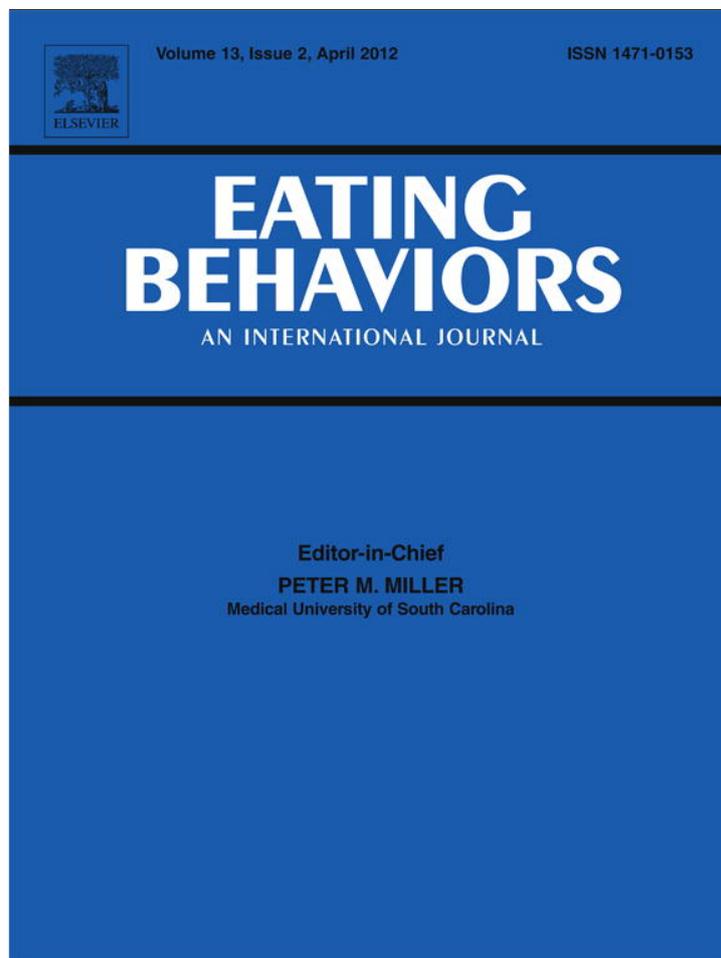


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An examination of dieting behaviors among adults: Links with depression

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ABSTRACT

In the current study, we examined predictors of healthy and unhealthy dieting behaviors with the aim of examining whether or not weight control strategies are associated with depression. Men and women ($N = 198$; $M = 24.80$ years; 51% women) were recruited from a university campus and its surrounding community in the northeastern US. Participants' height and weight were measured, and they completed a survey on health behaviors and attitudes. Results indicated that women and men with high BMIs were more likely to engage in both healthy and unhealthy dieting behaviors than those with low BMIs. Additionally, women with higher levels of depressive symptoms utilized fewer healthy dieting behaviors and more unhealthy dieting behaviors. Depression was not linked to healthy or unhealthy dieting behaviors in men. These findings are discussed in terms of the potential reciprocal relationship between women's unhealthy weight control strategies and depression.

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1. Introduction

Dieting is a common practice among individuals in the US. Among adults, 24.3–32.8% of men and 37.6–46.3% of women are trying to lose weight (Bish et al., 2005; Kruger, Galuska, Serdula, & Jones, 2004). Although dieting may be beneficial for some individuals, research indicates that some people who diet are not actually overweight (Kenardy, Brown, & Vogt, 2001; Neumark-Sztainer, Sherwood, French, & Jeffery, 1999). Further, when individuals diet, they may not use effective weight loss methods; few dieters combine eating fewer calories and exercising more (Kruger et al., 2004).

Dieting has important implications for physical and mental health. Among women, more frequent dieting is linked to more disordered eating and poorer body image (Ackard, Croll, & Kearney-Cooke, 2002; Cachelin, Striegel-Moore, & Paget, 1997; Kenardy et al., 2001). Dieters share some characteristics with individuals who have eating disorders (French & Jeffery, 1994; Polivy & Herman, 1987) and dieters are at heightened risk for clinical eating problems (French & Jeffery, 1994). More frequent dieting is also associated with other psychological problems in women, such as lower self-esteem, poorer emotion regulation, and schizophrenia (as measured on the MMPI-2; Ackard et al., 2002; Cachelin et al., 1997). In adult men and women, weight instability (a potential outcome of dieting) is linked to lower satisfaction with health and lower self-esteem (Serdar et al., 2011). Not only

is dieting linked to negative health outcomes, but it may also backfire. For example, Savage, Hoffman, and Birch (2009) found that women who reported dieting at the beginning of their study gained more weight over 6 years than those who were not dieting in the beginning of the study. Weight gain from dieting may, in turn, elicit even more drastic weight loss methods. Given the current prevalence of dieting and its outcomes, it is critical to understand factors that predict this behavior.

One limitation of the dieting literature is that it focuses on adolescents and college students, particularly girls and women, with considerably less focus on adults. Similar to adolescents and college students, adults may feel pressure to be thin, but have the added pressure of appearing youthful as their bodies age. Not only do adults experience changes in their skin and hair (e.g., wrinkles, thinner hair), but they also tend to gain weight into middle adulthood (Tiggemann, 2004; Williamson, 1993), which makes dieting more appealing as well as more challenging. To that end, studies indicate body image concerns in both adult men and women, as well as a high prevalence of weight loss behaviors (Kenardy et al., 2001; Markey, Markey, & Birch, 2001; McCabe & Ricciardelli, 2004; Neumark-Sztainer et al., 1999; Tiggemann, 2004). Another limitation of the existing literature is the measurement of dieting behavior. In many studies, measures tend to assess general, rather than specific, dieting behaviors. Dieting, however, may consist of healthy behaviors—dietary and physical activity behaviors that are healthful strategies for trying to lose weight (e.g., eating more fruits and vegetables, eliminating snacks)—or unhealthy behaviors—weight loss behaviors that are more extreme and potentially harmful (e.g., taking diet pills, excessively exercising; French, Perry, Leon, & Fulkerson,

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1995)—each of which may have unique correlates. In the current study, we examine predictors of both healthy and unhealthy dieting in a community sample of adult men and women.

We examine gender as a predictor of dieting behavior given past research indicating its relevance. More women than men report a history of dieting (Neumark-Sztainer et al., 1999), and current attempts at weight loss (Bish et al., 2005; Kruger et al., 2004). Most women report engaging in some type of healthy dieting behavior (Markey et al., 2001), and utilize more healthy dieting behaviors than men (Boyes, Fletcher, & Latner, 2007; Markey et al., 2001) perhaps because women are socialized to be more attentive to their health (Chrisler, 2001). Women are also more likely to engage in unhealthy dieting behaviors than men. In order to attain the cultural ideal of thinness and avoid the negative social and psychological consequences of obesity—which tend to be greater for women—(Ferguson, Kornblat, & Muldoon, 2009), women may use extreme measures to achieve weight control. In one study, women engaged in more unhealthy dieting behaviors than did men (Markey et al., 2001), but in another, there was no significant difference between men's and women's unhealthy dieting behavior (Boyes et al., 2007). In sum, although previous studies suggest that women are more prone to diet than men, gender differences in specific weight loss strategies, as well as predictors of these strategies, are less clear.

Although women might diet more frequently than men, BMI appears to predict both men's and women's dieting behavior. Research indicates that weight loss behaviors and dieting are more common among those who have higher BMIs (Cachelin & Regan, 2006; Kruger et al., 2004; Savage et al., 2009), although women are more likely to attempt weight loss at lower BMIs as compared to men (Bish et al., 2005). Other studies have examined whether or not the link between BMI and dieting varies by type of dieting behavior. Higher BMI is associated with more frequent healthy dieting behaviors in both men and women (Markey et al., 2001), and with more vegetable consumption, but not more fruit consumption, in lower income women (Williams, Ball, & Crawford, 2010). However, Lanza, Savage, and Birch (2010) found that compared to normal weight women, overweight women were less likely to adhere to current dietary recommendations.

Associations between unhealthy dieting behavior and higher BMI have been found in multiple populations, including adolescent girls (Eisenberg, Neumark-Sztainer, Story, & Perry, 2005), adult women (Markey et al., 2001), and a sample of mostly overweight and obese individuals (Kushner & Choi, 2010). However, Lanza et al. (2010) found similar percentages of normal and overweight women who try a variety of different weight loss strategies (including both healthy and unhealthy strategies). In sum, although there are some contradictory findings, most prior research suggests that individuals with higher BMIs are more likely than those with lower BMIs to try both healthy and unhealthy dieting strategies in an effort to lose weight.

In addition to physical size, psychological factors may be relevant to dieting behavior, particularly depression. Individuals who are depressed may participate in extreme, somewhat punitive behaviors such as utilizing unhealthy dieting strategies, and may also lack the motivation to eat healthfully. In the present study, we examine whether or not there is an association between healthy and unhealthy dieting behaviors and depression in men and women. We draw on Stice and Bearman's (2001) gender additive model to support the investigation of these links. In their model, adolescent girls experience factors that increase their risk for depression that boys do not, namely, body image and eating-related problems. In particular, they suggest that dieting is associated with depression among girls because dieting that does not produce intended outcomes may lead to distress, or because limiting calories may negatively impact mood. Studies support the dieting-depression link in both adolescent girls and boys (Crow, Eisenberg, Story, & Neumark-Sztainer, 2006;

Daniels, 2005; Vaughan & Halpern, 2010). Because body image is an important concern for males and is linked to poorer psychological health (McCabe & Ricciardelli, 2004), body- and eating-related issues may also be risk factors for depression in men.

In adults, evidence is mixed as to whether the depression-dieting link is found in just women or in both genders. Studies of all-female samples show links between depression and dieting (Ackard et al., 2002; Cachelin et al., 1997; Kenardy et al., 2001), and one study of adults showed that weight instability was associated with depression in women, but not men (Serdar et al., 2011). In contrast, other work shows that both men and women who engage in more chronic dieting have more depressive symptoms (Cachelin & Regan, 2006), and that men and women with a history of depressive symptoms are more likely to try to lose weight (Green & Pope, 2000).

Although previous research suggests a link between depression and dieting (e.g., Ackard et al., 2002; Cachelin & Regan, 2006), researchers have not fully examined whether or not this association might occur for both healthy and unhealthy dieting behaviors. Individuals with higher depressive symptoms may lack the energy or desire to engage in health-promoting behaviors, such as exercising or eating home-prepared healthful foods. Fulkerson, Sherwood, Perry, Neumark-Sztainer, and Story (2004) found that male and female adolescents with higher levels of depressive symptoms ate breakfast, lunch, and dinner less often. However, associations between more general measures of healthy dieting behavior and depression have been nonsignificant in both male and female adolescents and adults (Fulkerson et al., 2004; Markey et al., 2001).

Individuals who have higher depressive symptoms may also be more willing to place their health at risk by engaging in harmful behaviors, such as unhealthy dieting. Some research has identified the link between depression and unhealthy dieting among only women (e.g., Markey et al., 2001), whereas other research suggests that both men and women who have more depressive symptoms engage in more unhealthy dieting behavior (Boyes et al., 2007). In contrast to these studies, a recent study of adult women found that depression was not associated with women's use of different weight-loss strategies (Lanza et al., 2010). The present study will address the inconsistent findings in this research by examining men's and women's healthy and unhealthy efforts to lose weight in relation to their levels of depression.

The goal of the current study is to examine gender, BMI, and depression as predictors of healthy and unhealthy dieting behaviors in a community sample of adult men and women. Based on previous literature, we propose the following hypotheses:

1. Women will engage in more healthy and unhealthy dieting behaviors than men.
2. Individuals with higher BMIs will engage in more healthy and unhealthy dieting behaviors than those with lower BMIs. We will explore interactions between gender, BMI, and dieting.
3. Individuals with more depressive symptoms will engage in fewer healthy dieting behaviors and more unhealthy dieting behaviors, as compared to those with fewer depressive symptoms. We will explore interactions between gender, depression, and dieting.

2. Method

2.1. Participants and procedure

The sample included ($N = 198$) adults who participated in a larger study about romantic relationships and health. Fifty-one percent of the participants were women, participants' average age was 24.80 years ($SD = 7.20$), and most participants self identified as European American/White (73%). To recruit participants, we posted flyers and advertisements around a university campus and its surrounding community in the northeastern United States. Participants were

invited to the research lab to complete a questionnaire addressing health behaviors and attitudes. The study lasted approximately 1.5 h, and participants each received \$25 for their time, except for 14% of the sample who chose to receive research credits toward their Introduction to Psychology class instead. This study was approved by the university's Institutional Review Board, and all participants provided informed consent.

2.2. Measures

2.2.1. BMI

Trained research assistants measured participants' height in centimeters and weight in kilograms. Measurements were taken three times, based on Lohman, Roche, and Martorell's (1988) recommendation. The average height and weight across the three measurements were used to calculate BMI (see CDC [2010] for the formula). In this sample, women's average BMI was 23.93 ($SD = 5.08$, range = 17.45–47.71) and men's average BMI was 27.45 ($SD = 6.0$, range = 18.79–49.66). The percent of men in this sample who were overweight (40%) or obese (25%) is similar to national statistics on the prevalence of overweight and obesity. However, the percent of women who were overweight (22%) or obese (8%) was much lower than the percent typically reported for women (criteria for overweight and obesity are determined in accordance with standards set by the Centers for Disease Control and Prevention, 2010; see Flegal, Carroll, Ogden, & Curtain, 2010, for detailed information about overweight and obesity prevalence).

2.2.2. Depression

We measured depression using the Center for Epidemiological Studies Scale for Depression (CES-D; Radloff, 1977). The CES-D is a widely used measure of depressive symptoms, particularly depressed mood, designed for use among adults in community samples. Participants were asked to indicate how often they felt or behaved a particular way during the past week (e.g., "I was bothered by things that don't usually bother me"). The CES-D has 20 items with response options ranging from 1 = rarely or none of the time, to 4 = most of the time. Reliability in the current study was satisfactory for both women ($\alpha = .88$) and men ($\alpha = .89$).

2.2.3. Dieting behavior

The Weight Control Behavior Scale (WCBS; French et al., 1995) is a 24-item scale that assesses different weight loss behaviors. We removed 3 items from the original scale (diet centers with food, weight loss groups, and other) because it is not clear whether they constitute healthy or unhealthy dieting behaviors (French et al., 1995). In the current study, subscales include healthy dieting behavior (12 items; e.g., "eat more fruit and vegetables") and unhealthy dieting behavior (9 items; e.g., "skip meals"). For each item, participants were asked to indicate how often they used that strategy to lose weight in the past year (0 = never, 1 = sometimes, 2 = always). For each subscale items were summed in order to provide an overall "healthy dieting behavior" and "unhealthy dieting behavior" score. Reliabilities for the healthy dieting behavior scale were ($\alpha = .87$) for women and ($\alpha = .88$) for men, and for the unhealthy dieting behavior scale, ($\alpha = .70$) for women and ($\alpha = .67$) for men.

3. Results

In order to examine the three hypotheses of the current study, separate hierarchical regression analyses were computed for healthy dieting behaviors and unhealthy dieting behaviors. In each of these analyses, gender (G), body mass index (BMI), and depression (D) were entered in the first step. In the second step, the moderating effect of gender was examined for both BMI ($G \times BMI$) and depression ($G \times D$). To reduce issues associated with multicollinearity, depression

Table 1
Multiple regression analysis predicting healthy dieting behaviors.

		B	SE B	β
<i>Step 1</i>				R = .41**
Gender (G)		−4.87	.80	−.42**
Body Mass Index (BMI)		.24	.07	.24**
Depression (D)		−.06	.05	−.09
<i>Step 2</i>				R = .45**
$G \times BMI$		−.17	.14	.13
$G \times D$.21	.09	.22*

Note. $n = 198$; * $p < .05$ ** $p < .01$.

and BMI were centered and gender was dummy coded (0 = women and 1 = men; Cohen & Cohen, 1983).

As shown in Tables 1 and 2, and consistent with the first hypothesis, even after controlling for BMI and depression, women tended to utilize more healthy and unhealthy ($M = 12.12$ and $M = 1.40$ respectively) dieting behaviors than men ($M = 7.25$ and $M = .64$, respectively); $t(195) = -6.01$, $p < .01$ and $t(195) = -3.27$, $p < .01$, respectively). Additionally, consistent with the second hypothesis, participants who had higher BMIs were more likely to engage in both healthy and unhealthy dieting behaviors (see Tables 1 and 2). The nonsignificant gender interaction in Step 2 indicates that the effect of BMI on dieting was not significantly different for women and men (see Tables 1 and 2). Finally, consistent with our third hypothesis about women but not men, there were significant interactions between gender and depression for both healthy and unhealthy dieting behaviors (see Tables 1 and 2). These findings indicate that the effects of depression on dieting behaviors were different for men and women.

In order to examine exactly how gender moderated the effect of depression on healthy and unhealthy dieting, graphical representations of both interactions were created (see Figs. 1 and 2) and the simple regression equations corresponding to men and women were computed (Aiken & West, 1991). Significance tests of the simple slopes (Aiken & West, 1991) presented in Figs. 1 and 2 reveal that depression was unrelated to both healthy ($t(192) = .63$, $p = .52$) and unhealthy ($t(192) = 1.93$, $p = .06$) dieting behaviors among men. However, consistent with hypothesis 3, depression was negatively related to healthy dieting behaviors ($t(192) = -2.59$, $p < .01$) and positively related to unhealthy dieting behaviors ($t(192) = 3.61$, $p < .01$) among women. In other words, women who had higher depressive symptoms were less likely to utilize healthy dieting behaviors and more likely to utilize unhealthy dieting behaviors than women with fewer depressive symptoms.

4. Discussion

This study aimed to examine physical and psychological predictors of healthy and unhealthy dieting behaviors among men and women. Although research examining dieting behaviors is vast, the distinction between healthy (e.g., eating fruit and vegetables) and unhealthy (e.g., skipping meals) attempts to lose weight is not often

Table 2
Multiple regression analysis predicting unhealthy dieting behaviors.

		B	SE B	β
<i>Step 1</i>				R = .37**
Gender (G)		−.73	.22	−.23**
Body Mass Index (BMI)		.06	.02	.23**
Depression (D)		.05	.01	.27**
<i>Step 2</i>				R = .41**
$G \times BMI$		−.02	.04	−.04
$G \times D$		−.05	.02	−.20*

Note. $n = 198$, * $p < .05$, ** $p < .01$.

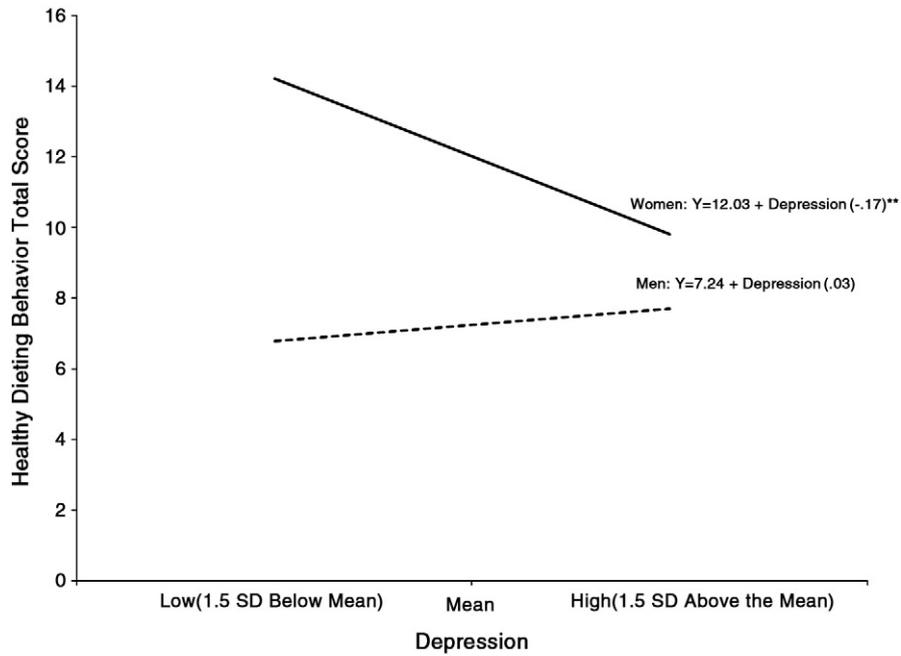


Fig. 1. Interaction between gender and depression when predicting healthy dieting behaviors.

made. Further, past research has tended to focus primarily on girls and women, leaving us with less information about predictors of weight loss strategies among men. By examining both physical (e.g., BMI) and psychological (e.g., depression) predictors of dieting behaviors, this study suggests some similar and different correlates of dieting behaviors among men and women.

Consistent with our first hypothesis and previous research, we found that women were more likely to engage in both healthy and unhealthy means of losing weight than were men. Interestingly, this was not because women in this sample were more likely to be overweight than men (i.e., in need of weight loss for health reasons). In fact, women were less likely to be overweight or obese than were

the men in this sample; this sample was comprised of a relatively thin sample of women (when compared to data from U.S. samples). Thus, it appears that women are not necessarily in need of weight loss for health reasons, but are apt to adopt any and all strategies to lose weight due to societal emphasis on the importance of thinness among women for aesthetic reasons (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999). Although men are increasingly being depicted in the media as both lean and muscular (Olivardia, 2002) and researchers have speculated that young men are vulnerable to body dissatisfaction and maladaptive body-change strategies (including dieting; McCabe & Ricciardelli, 2004), these data suggest that men may not be internalizing this societal prescription for thinness to the

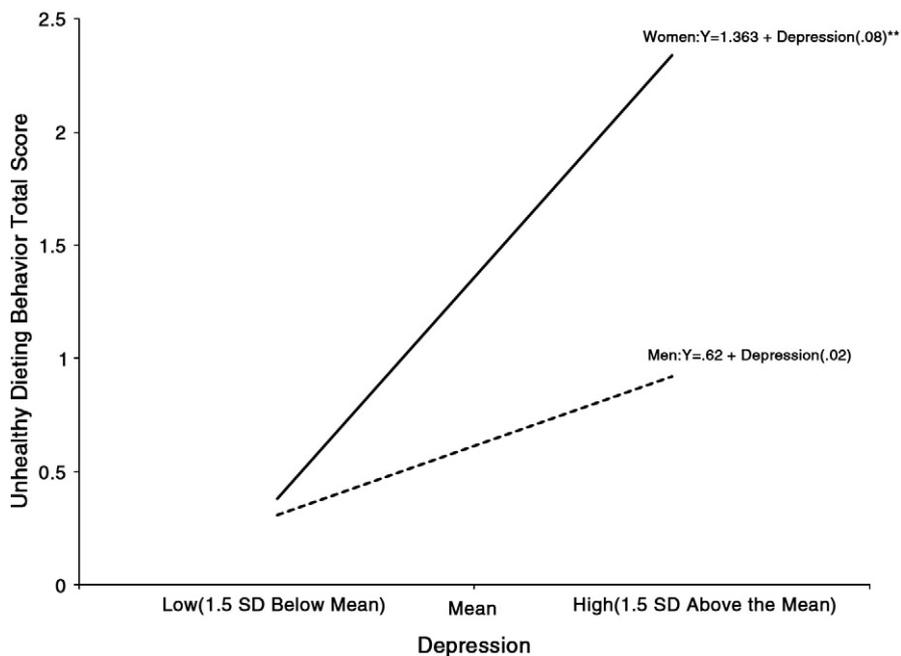


Fig. 2. Interaction between gender and depression when predicting unhealthy dieting behaviors.

extent that women are. Or, perhaps, men's investment in fitness and muscle-building is at odds with many typical weight loss strategies (e.g., calorie restriction).

Consistent with our second hypothesis and previous research, BMI was a significant predictor of dieting behaviors for both men and women. Specifically, both men and women who had higher BMIs were more likely to engage in healthy and unhealthy dieting strategies than were men and women who had lower BMIs. Perhaps medical professionals, family, friends, or other members of these individuals' social circles are suggesting the importance of weight loss for those with relatively high BMIs. Health concerns combined with a desire to look physically attractive may lead both men and women who are overweight or obese to use multiple healthy and unhealthy attempts at weight loss.

Our third hypothesis was supported for women but not for men. Women who had more depressive symptoms engaged in fewer healthy dieting behaviors and more unhealthy dieting behaviors than women who had fewer depressive symptoms. In contrast, depression was not significantly associated with men's healthy or unhealthy dieting behaviors. These findings suggest that *Stice and Bearman's* (2001) model, which predicts an association between weight management strategies and depression in female adolescents (but not their male counterparts), may be extended to adults. Also building on this model, we propose that there may be reciprocal relations among dieting strategies and depression.

Our findings indicate that women who are depressed are unlikely to utilize healthy dieting strategies, which suggests that a "healthy state of mind" may be a precursor to the adoption of adaptive efforts to lose weight. These healthy weight-loss efforts often require planning: packing a healthy lunch to take to work or school, making time for exercise, and waking up early enough to have breakfast. It is possible that women who are distraught or depressed (particularly about their weight status) may be less likely to engage in these sorts of planful, adaptive attempts to lose weight. In contrast, their use of unhealthy weight loss strategies (e.g., purging, skipping meals) may represent a form of self-punishment due to disgust with their weight status or themselves in general. Thus, an extension of the gender additive model (*Stice & Bearman, 2001*) may be that depression tends to lead to increasingly maladaptive dieting behaviors as women become both more desperate to lose weight and more psychologically unfit to make healthy choices. Ultimately, maladaptive dieting behaviors may be associated not only with depression but with eating disorders as well (*French & Jeffery, 1994*), which suggests the need for health care professionals to reduce women's unhealthy dieting behaviors before they become more complex long-term mental health problems. In contrast, depression was unrelated to healthy and unhealthy dieting behaviors in men. Given our findings linking BMI and dieting in men, it is possible that physical rather than psychological factors such as depression may be more important motivators for men's dieting behavior.

4.1. Limitations

To our knowledge, this research represents one of the first attempts to consider predictors of both men's and women's healthy and unhealthy dieting behaviors. However, these findings should be tempered with an understanding of the limitations inherent in this research. This research is cross-sectional; thus, all speculation about the causal links among the variables investigated is speculation based on ours' and others' research. For example, it is impossible to conclusively determine whether depression leads to dieting behaviors or the reverse. Additional longitudinal research is needed to confirm the direction of effects among the variables investigated in this study. Further, the sample of adults who participated in this study was relatively homogenous in terms of age (in their 20s) and race/

ethnicity (predominantly of European-American descent). Because weight tends to change with age (*Williamson, 1993*) and cultural influences on eating behaviors are strong (*Gracia-Arnaiz, 2010*), additional research that explores more diverse samples in terms of these demographic qualities is needed.

4.2. Conclusions

This study suggests both similarities and differences in factors that promote healthy and unhealthy dieting behaviors among men and women. Clearly, weight status is an important influence on dieting behaviors among both men and women. Heavier men and women are more likely to engage in both healthy and unhealthy dieting behaviors, suggesting the potentially important role of preventative efforts that keep men and women from becoming overweight in the first place. Ideally, girls and boys will establish healthful eating patterns that promote healthy weight statuses and eliminate the need for dieting in adulthood. However, as obesity rates continue to rise, it seems unlikely that most adults will be spared from dieting efforts. Thus, it becomes critical to understand factors that may contribute to healthy attempts at weight-management and weight loss among adults.

Our findings linking BMI and dieting behaviors suggest that larger body size may be an important motivator to diet for both genders. Alternatively, as suggested by prior work (e.g., *Savage et al., 2009*), dieting behaviors may backfire and lead to an increase in BMI. A circular pattern may evolve for many individuals with failed attempts at dieting perpetuating or increasing overweight status (*Markey & Markey, 2005*). The association between depression and dieting behaviors among women, but not men, highlights the psychological nature of dieting for women. As other researchers have articulated (e.g., *Ferguson et al., 2009*), women's weight status is not just a metric of their health, but is often conceptualized as a metric of their self-worth and societal value. Taken together, these findings suggest the importance of physicians' and other medical professionals' awareness of the complex dynamics between gender, depression, and weight loss behaviors.

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Contributors

Meghan Gillen conducted literature searches, contributed to the conception and analyses of the paper, and wrote some sections of the manuscript. Charlotte Markey designed the study, contributed to the conception and analyses of the paper, and wrote some sections of the manuscript. Patrick Markey contributed to the conception of the paper, conducted all statistical analyses, and wrote some sections of the manuscript. All authors contributed to and have approved the final manuscript.

Conflict of interest

The authors declare no conflict of interest.

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