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TRANSACTIONS BETWEEN THINNESS EXPECTANCIES AND DEPRESSION IN THE PREDICTION OF ADOLESCENT WEIGHT RESTRICTING BEHAVIORS

Anna Marie L. Ortiz
University of Kentucky, annamarie.ortiz@uky.edu
Author ORCID Identifier:
https://orcid.org/0000-0002-4761-2595
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TRANSACTIONS BETWEEN THINNESS EXPECTANCIES AND DEPRESSION IN
THE PREDICTION OF ADOLESCENT WEIGHT RESTRICTING BEHAVIORS

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THESIS
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A thesis submitted in partial fulfillment of the
requirements for the degree of Master of Science in the
College of Arts and Sciences
at the University of Kentucky

By

Anna Marie Lilia Ortiz

Lexington, Kentucky

Director: Dr. Gregory T. Smith, Professor of Psychology

Lexington, Kentucky

2018

ABSTRACT OF THESIS

TRANSACTIONS BETWEEN THINNESS EXPECTANCIES AND DEPRESSION IN
THE PREDICTION OF ADOLESCENT WEIGHT RESTRICTING BEHAVIORS

Both the transdiagnostic risk associated with depression and the eating disorder-specific risk associated with expectancies for reinforcement from thinness have been identified as risk factors for the development of weight restricting behaviors. The purpose of this study was to examine if these risk factors transact to further predict risk in youth. Depression, thinness expectancies, and weight restriction were assessed in 1,907 adolescents three times during the transitional period between middle school and high school. We compared three different possible transactional processes. Mediation tests demonstrated that depression in 8th grade predicted an increase in the number of weight restricting behaviors endorsed in 10th grade through its predictive influence on thinness expectancies in 9th grade. However, our results were not consistent with a mediational process in which thinness expectancies predicted depression to further predict weight restriction. The two risk factors interacted to predict subsequent weight restriction, such that at higher levels of depression, the association between thinness expectancies and weight restriction was stronger. It appears that transdiagnostic and disorder-specific risk factors transact to increase risk. These findings contribute to the understanding of the developmental risk process for weight restricting behavior in youth.

KEYWORDS: thinness expectancies, depression, weight restricting

Anna Marie Lilia Ortiz

May 20, 2018

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By

Anna Marie Lilia Ortiz

Gregory T. Smith
Director of Thesis

Mark Fillmore
Director of Graduate Studies

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Prediction of Adolescent Weight Restricting Behaviors

Eating disorders are widespread but are often left untreated or are under-treated (Hudson, Hiripi, Pope, & Kessler, 2007). Nearly 40 million men and women will suffer from a diagnosable eating disorder at some point in their lives (Wade, Keski-Rahkonen, & Hudson, 2011). Eating disorders also have one of the highest rates of mortality among psychiatric disorders (Arcelus, Mitchell, Wales, & Nielsen, 2011). Therefore, understanding the etiology of these disorders is imperative to help identify those who are at an elevated risk and to enhance preventative care.

While eating disorders are not exclusive to a particular age group, adolescence is a period of time in which individuals are at a heightened risk of developing symptomatic behaviors (Bulik, 2002; Ferreiro, Seoane, & Senra, 2012). Particularly, diagnosable eating disorders become more frequent during the middle and high school years (Allen, Crosby, Oddy, & Byrne, 2013a; Lewinsohn, Striegel-Moore, & Seeley, 2000; Stice, Killen, Hayward, & Taylor, 1998; Van Son, Van Hoeken, Bartelds, Van Furth, & Hoek, 2006). Therefore, to determine accurately the developmental emergence of eating disorders, it may be critical to assess the adolescent years.

One crucial aspect of eating disorders is the use of extreme weight restricting behaviors. Weight restricting behaviors are divided into two categories, namely, nonpurging and purging behaviors. Nonpurging compensatory behaviors include compensatory exercise and fasting. Compensatory exercise refers to exercise used as a means of compensating for food consumed or to influence one's weight, shape, or appearance (Fairburn & Cooper, 1993; Holland, Brown, & Keel, 2014; Mond &

Calogero, 2009). Fasting is typically defined as abstaining from eating for eight waking hours or more with the intention of influencing one's weight or shape (Cooper & Fairburn, 1987). Research indicates that a sizable number of adolescents are engaging in these nonpurging compensatory behaviors. A recent study found that at the start of 8th grade, 31.6% of girls and 18.6% of boys endorsed the use of compensatory exercise (Davis, Ortiz, & Smith, 2017). The reported rates of these behaviors remained substantial into the high school years, such that 14.4% of girls and 12.9% of boys endorsed compensatory exercise at the end of 10th grade (Davis et al., 2017). A significant number of adolescents also reported fasting behaviors at the end of 10th grade (15.5% of boys and girls; Davis et al., 2017).

The second type of weight restricting behavior involves purging behaviors. Purging behaviors include self-induced vomiting, laxative use, and diuretic use. Purging behaviors also appear to be prevalent in adolescent populations (Davis et al., 2017). Particularly, research has provided evidence that 9.8% of 8th grade girls and 6.2% of 8th grade boys endorsed the use of purging behaviors (Davis et al., 2017).

Although weight restricting behaviors often occur within the context of a diagnosable eating disorder, they can also be present in cases that do not meet full clinical diagnostic criteria (Carter, Stewart, & Fairburn, 2001; Mond, Hay, Rodgers, Owen, Crosby, & Mitchell, 2006; Zarychta, Luszczynska, & Scholz, 2014). Individuals who engage in weight restricting behaviors without meeting diagnostic criteria for an eating disorder still experience significant negative consequences (Chamay-Weber, Narring, & Michaud, 2005; Lewinsohn et al., 2000; Stice, Marti, Shaw, & Jaconis, 2009; Wade, Wilksch, & Lee, 2012).

Numerous findings demonstrate that there are many adverse outcomes associated with weight restricting behaviors. For example, individuals who participate in these behaviors report greater thin-ideal internalization (LePage, Crowther, Harrington, & Engler, 2008), psychosocial functional impairment (Mond & Hay, 2007; Mond et al., 2006), psychological distress (Davis, Holland, & Keel, 2014; Stiles-Shields, Goldschmidt, Boepple, Glunz, & Le Grange, 2011; Wade & O'Shea, 2015), and depression (Allen et al., 2013a; Davis, Guller, & Smith, 2016). Additionally, engaging in weight restriction during adolescence predicts the development of diagnosable eating disorders in adulthood (Neumark-Sztainer et al., 2006).

While there are numerous risk factors for the development of weight restricting behaviors, many models of risk include the idea that it is desirable to be thin. In the current study, we represent this notion by measuring expectancies for reinforcement from thinness. This expectancy concept reflects the understanding that, as a result of differing learning histories, individuals vary in the degree to which they have learned to expect that thinness provides overgeneralized life improvement (e.g., increased attractiveness, greater respect from others, feeling more competent, increased confidence; Hohlstein, Smith, & Atlas, 1998). High endorsement of thinness expectancies is thought to represent having learned to expect a great deal of reinforcement from being thin (Hohlstein et al., 1998; Pearson, Wonderlich, & Smith, 2015).

There is considerable evidence for the validity of the thinness expectancy concept as a risk factor for eating disorder symptoms. Women diagnosed with anorexia nervosa, a disorder involving excessive weight restriction, tend to endorse this expectancy to a greater degree than other women (Hohlstein et al., 1998). This expectancy also predicts

the emergence of purging behaviors in adolescence (Combs, Smith, Flory, Simmons, & Hill, 2010; Smith, Simmons, Flory, Annus, & Hill, 2007). Using a laboratory design, an experimental reduction in thinness expectancy endorsement resulted in reductions in eating disorder symptoms in both high school and college women (Annus, Smith, & Masters, 2008). It thus appears that learned expectancies for reinforcement from thinness increase risk for disordered eating and weight reduction behaviors.

Interestingly, although women in the Western world are virtually all exposed to the ideal of a thin body, only a subset of women (a) endorse thinness expectancies very strongly or (b) develop unhealthy weight restriction behaviors. To understand why this is the case, examining the role of other risk factors may be important (Culbert, Racine, & Klump, 2015). That is, other factors may influence (a) the likelihood of forming strong expectancies for reinforcement from thinness and/or (b) the strength of the relationship between thinness expectancy endorsement and weight restriction behaviors.

One possibly relevant risk factor may be depressive symptoms. Similar to eating disorder behaviors, depressive symptoms are highly prevalent in adolescent populations (Saluja et al., 2004). A growing body of literature has indicated that depressive symptomatology is associated with many forms of psychopathology, suggesting it serves a role as a transdiagnostic risk factor (Angold, 1993; Silk, Steinberg, & Morris, 2003).

Of particular relevance to the current study, research has documented substantial comorbidity between symptoms of depression and weight restricting behaviors (Allen, Bryne, Oddy, & Crosby, 2013b; Sinton & Birch, 2005; Stice & Agras, 1998). For example, one cross-sectional study found depression to be a significant concurrent predictor of laxative use, fasting, and self-induced vomiting among middle and high

school students (Lepowsky, 2014). Importantly, depressive symptoms predict weight restriction behaviors longitudinally. For example, depression occurring during middle school or high school predicts subsequent endorsement of extreme weight loss behaviors such as the use of diet pills, laxatives, or self-induced vomiting (Liechty & Lee, 2013). Depressive symptoms during early adolescence are associated with increased risk of later dietary restriction and purging behavior (Johnson, Cohen, Kotler, Kasen, & Brook, 2002). It thus appears to be the case that depressive symptoms can pre-date and predict the emergence of weight restriction behaviors.

The Current Study

Given the evidence that depressive symptoms do predict subsequent weight restricting behaviors, as do thinness expectancies, it may prove useful to investigate whether the two transact to increase risk. We considered three possibilities. The first two concerned the possibility that elevations in one risk factor anticipate subsequent elevations in the other, thus increasing risk for weight restriction. The two possibilities we tested were that depressive symptoms predict subsequent increases in expectancies for reinforcement from thinness, thus potentiating weight restricting behaviors, and the reverse: that thinness expectancies predict subsequent increases in depressive symptoms, thus potentiating weight restricting behaviors. There are plausible theoretical grounds for each risk factor predicting increases in the other.

Those who are experiencing elevations in depressive symptoms may be more susceptible to the thin-ideal message in that they see it as a means of alleviating their depression (Rodgers, Paxton, & Chabrol, 2010; Szmukler, 1987). Because they want to reduce their depressive experience, they may be particularly responsive to the message

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that being thin produces general life improvement. Perhaps they will then form stronger expectancies for reinforcement from thinness (McCarthy, 1990). Such a process would help clarify why, though virtually all women are exposed to the thin-ideal, not all women endorse thinness reinforcement expectancies very strongly. In this case, higher levels of depression would lead to a greater endorsement of thinness expectancies. Thus, there may be a mediational process in which depression predicts weight restriction behaviors through its predictive influence on thinness expectancies.

The reverse pathway may operate as well. To the degree that a woman endorses strong expectancies for reinforcement from thinness, she is at risk for the disappointment associated with not meeting societal thinness standards. For most women, the thin-ideal is an unrealistic standard to achieve. Perhaps for some women, expecting valued reinforcement from thinness but not being able to achieve the desired thinness produces increased negative affect or reduced positive affect, and thus increases in depressive symptoms. For this reason, perhaps there is a reverse mediational process, in which the influence of thinness expectancies on weight restriction operates through its predictive influence on depressive symptomatology. Such a process would help explain why elevated thinness expectancies do not predict weight reduction behaviors for all women. Perhaps the effect of thinness expectancies on weight restriction operates, in part, by potentiating increases in their depressive symptoms.

The third possibility is that the two risk factors interact to increase risk for weight restriction. Perhaps there is a joint effect of elevations in depressive symptoms and thinness expectancies, such that the presence of elevations in both risk factors predicts increased weight restriction.

To investigate the three possible transactional processes described, we conducted a longitudinal study across three measurement waves. We focused on the developmental transition period from the end of middle school to the early high school years, largely because this period may be associated with increases in diagnosable eating disorders (Bulik, 2002).

We tested adolescents ($n=1907$) at three time points: the spring of 8th, 9th, and 10th grade, where 9th grade is the first year of high school. We tested two mediational hypotheses in our model. First, (a) 8th grade depressive symptoms predict 9th grade thinness expectancies, controlling for 8th grade thinness expectancies; (b) 9th grade thinness expectancies predict 10th grade weight restriction behaviors, controlling for 9th grade weight restriction behaviors; and (c) there is a mediation process from 8th grade depressive symptoms to 10th grade weight restriction behaviors, with 9th grade thinness expectancies as mediator. Second, (a) 8th grade thinness expectancies predict 9th grade depressive symptoms, controlling for 8th grade depressive symptoms; (b) 9th grade depressive symptoms predict 10th grade weight restriction behaviors, controlling for 9th grade weight restriction behaviors; and (c) there is a mediation process from 8th grade thinness expectancies to 10th grade weight restriction behaviors, with 9th grade depressive symptoms as mediator.

We also tested a moderation model: (a) in 8th grade, the interaction of depressive symptoms and thinness expectancies predicts 9th grade weight restriction behaviors, controlling for 8th grade weight restriction behaviors, 8th grade depressive symptoms, and 8th grade thinness expectancies. (b) in 9th grade, the interaction of depressive symptoms and thinness expectancies predicts 10th grade weight restriction behaviors, controlling for

9th grade weight restriction behaviors, 9th grade depressive symptoms, and 9th grade thinness expectancies.

An additional consideration was whether the hypothesized processes differed as a function of gender. Most eating disorder risk models are thought to pertain primarily to women and girls, but there have also been risk models that operate the same for both genders (Pearson, Combs, Zapolski, & Smith, 2012). To address model similarity or difference by gender, after conducting the model test on the full sample, we then tested the same model separately for girls and boys.

Methodology

Sample

Participants were drawn from a larger longitudinal study that followed youth from 5th grade through 10th grade. The initial sample was comprised of students of 5th grade classes in 23 elementary schools in two Kentucky counties. The sample consisted of 1,907 youths (939 girls and 968 boys). For the present study, participants were evaluated at the spring of 8th, 9th, and 10th grade. The participants were predominately European American (60.9%), followed by African American (18.7%), Hispanic (8.2%), Asian (2.9%), Middle Eastern (0.4%), or other (8.8%). The mean age of the participants at the start of the study, in the spring of 8th grade, was 13.33 years old. Retention findings are described below.

Measures

Demographic and Background Questionnaire. Participants were asked to circle their gender, write in their current age (in years), and indicate which label(s) best described their ethnic background.

Eating Disorder Examination-Questionnaire (*EDE-Q;* Fairburn & Beglin,

1994). This measure is a 9-item self-report questionnaire that was adapted from the semi-

structured interview, the Eating Disorder Examination (Cooper & Fairburn, 1993). The

questionnaire assesses eating behavior over the past two weeks. Past research has

demonstrated that this questionnaire has good reliability and validity (Cooper & Fairburn,

1993; Luce & Crowther, 1999; Mond, Hay, Rodgers, Owen, & Beumont, 2004). This

measure was adapted for youth by using age-appropriate language, reducing the length of

time that the questions referred to from 28 days to 2 weeks, and explaining more complex

concepts that could be difficult to understand (Carter et al., 2001). To measure

compensatory exercise, participants were asked "Over the past two weeks, have you

exercised a lot as a way to control your weight or because you ate a lot?" To measure

fasting, participants responded to the question "Over the past two weeks, have you gone

for long periods of time (8 hours or more) without eating anything in order to control

your shape or weight?" Diuretic use was assessed with the item "Over the past two

weeks, have you taken diuretics (pills that make you urinate or pee) as a means of

controlling your shape or weight or because you ate a lot?" The question "Over the past

two weeks, have you taken laxatives (pills or liquids that make you poop) as a means of

controlling your shape or weight or because you ate a lot?" was used to measure laxative

use. Lastly, self-induced vomiting was measured with the question "Over the past two

weeks, have you made yourself sick (vomit) as a means of controlling your weight, or

because you ate a lot?" All responses were measured dichotomously.

We created a count variable for weight restriction behaviors that summed the

number of ways an individual engaged in restricting behavior (i.e., 1 point was assigned

for engaging in each of the following behaviors: self-induced vomiting, laxative use, diuretic use, fasting, and compensatory exercise). Thus, the count variable could range in value from 0 to 5, depending on how many weight restricting behaviors were endorsed.

Thinness and Restricting Expectancy Inventory *(*TREI*; Hohlstein et al., 1998).* This single scale examines overgeneralized expectancies for life improvement as a result of dieting and thinness. It is internally consistent, stable over time, and predictive of eating disorder symptomatology (Combs et al., 2010; Hohlstein et al., 1998; MacBrayer, Smith, McCarthy, Demos, & Simmons, 2001; Simmons et al., 2002; Smith et al., 2007). Participants rated on a scale of 1 to 7 how strongly they endorsed different expectancies.

Center for Epidemiological Studies-Depression Scale (CES-D; Radloff, 1977). This scale was used to measure depressive symptomatology on an interval scale. Several studies have found this scale to be valid and reliable (Clarke et al., 2005; Roberts, Lewinsohn, & Seeley, 1991). This measure is often used with a variety of age groups, ranging from children to adults (Clarke et al., 2005; Radloff, 1977, 1991). It consisted of 20 items and asked the participant to rate how frequently they had experienced each symptom over the past week.

Procedure

Data Collection. Data for the current study were drawn from a larger longitudinal study. At each wave of the study, the questionnaires were administered in schools during school hours. A total of 23 public elementary schools were examined for Wave 1; Waves 2-7 studied 19 public middle schools; and two private high schools and seven public high schools were used for Waves 8 and 9. A passive consent procedure was used. Every family was mailed a letter through the U.S. Mail, introducing the study. If the families

did not want their child to participate in the study, the letter requested that the families

return an enclosed, stamped letter or call the phone number provided. In addition, at each

wave, participating students provided assent. Out of 1,988 students in the participating

schools, 95.9%, or 1907, of the students participated in the study. A total of 81 students

did not take part due to one of the following reasons: Families declined involvement for

their child, students did not assent, or an array of other reasons, such as language

disabilities that precluded completing the questionnaires.

For the current study, data were collected in the spring of three consecutive years

of 8th grade, the final year of middle school, 9th, and 10th grade. The measures were

completed in school cafeterias or classrooms. It was explained to the students that their

responses would be maintained in confidence. The research team introduced the federal

certificate of confidentiality for the project and stressed that they were legally required to

keep all responses confidential. Once participants signed the assent form, the researchers

handed out the questionnaires. Participants who left the study's school districts were

contacted and asked to complete the forms by mail. For doing so, they were compensated

$30 in 8th grade and $40 in 9th and 10th grade. Administering the questionnaires took 60

minutes or less. This procedure was approved by the University's IRB and by the

participating school systems.

Data Analysis. We used a structural equation modeling (SEM) approach to assess

the model. Although we are using data from the later part of a longitudinal study, we will

be referring to the waves in the current study as 1, 2, and 3. The model we tested included

cross-sectional associations among thinness expectancies, depressive symptoms, and

weight restriction. Specific additional pathways for the model are as follows. First, (a) all

autoregressive predictive effects from Wave 1 to Wave 2, Wave 2 to Wave 3, and Wave 1 to Wave 3; (b) the sequence of predictive effects for the first model described above: from Wave 1 depression to Wave 2 thinness expectancies and from Wave 2 thinness expectancies to Wave 3 weight restricting behavior; and (c) we included a test of whether Wave 2 expectancies mediated the predictive influence of Wave 1 depression on Wave 3 weight restriction. Second, (a) the sequence of predictive effects for the second model described above: from Wave 1 thinness expectancies to Wave 2 depression and from Wave 2 depression to Wave 3 weight restricting behavior; and (b) a test of whether Wave 2 depression mediates the predictive influence of Wave 1 expectancies on Wave 3 weight restriction.

Third, (a) the interaction of thinness expectancies and depression at Wave 1 predicting Wave 2 weight restriction, and (b) the interaction of thinness expectancies and depression at Wave 2 predicting Wave 3 weight restriction. To construct the interaction terms, we centered the measures of both depression and thinness expectancies and then calculated their product term to represent the interaction. Interactions were tested above and beyond the main effects of each variable. See Figure 1 for a depiction of the model, which also includes paths that are not central to the model test (e.g., Wave 2 depression to Wave 3 thinness expectancies).

Due to the large number of zero values on our key criterion of weight restricting behaviors (most adolescents were not engaging in these behaviors), we used negative binomial modeling. This approach allows for a large number of 0 values. We modeled weight restricting behavior as a count variable. To estimate the model, we used maximum likelihood estimation, robust to violations of normality (MLR). This method is

recommended for count variable criteria and provides for use of negative binomial modeling. It produces non-standardized parameter estimates. Traditional fit indices, such as the confirmatory fit index (CFI) and root mean square error of approximation (RMSEA) are not available using this modeling procedure. We report the AIC, BIC, and sample size adjusted BIC. Chi-square tests were used to compare differences between gender on the weight restriction variable.

We estimated the model first using the full sample. We then estimated it separately for boys and girls. We used MPlus (Muthén & Muthén, 2004) to run the analyses.

Results

Participant Retention

In the larger longitudinal study (n=1907), participation ranged from 1843 (96.7%) at wave 1 to 1416 (74.3%) at wave 9. From one wave to the next wave, retention rates ranged between 94.2% and 99.3% of prior wave participants. For the current study, three consecutive waves were used. The participation rates for these examined waves were as follows: wave 1, n = 1,495 (78.4% of the overall sample); wave 2, n = 1,428 (95.5% of the prior wave and 74.9% of the overall sample); wave 3, n = 1,416 (99.2% of the prior wave and 74.3% of the overall sample). Individuals who participated in all three waves did not differ on any study variable from those who participated in (a) only one or two waves and (b) prior waves of the parent longitudinal study. Therefore, we deduced that data were missing at random. Using expectation maximization (EM), we imputed the missing values. This procedure has been shown to more accurately approximate estimates of population parameters compared to traditional methods, such as case deletion or mean

substitution (Enders, 2006). Consequently, we were able to utilize our entire sample of n = 1,907.

Possible Effects due to School Membership

In order to determine whether there was significant covariance among the study variables due to participants attending the same school, we calculated intraclass coefficients for each variable (using elementary school membership, n = 23, as the nesting variable). All of the intraclass coefficients were 0.00. We therefore concluded that school membership was essentially unrelated to study variables.

Descriptive Statistics

The sample of Table 1 provides the means and standard deviations for weight restriction, depression, thinness expectancies, and the interaction effect of thinness expectancies and depression in the spring of eighth grade (Wave 1), in the spring of ninth grade (Wave 2), and in the tenth grade (Wave 3). The top panel of Table 1 depicts these values for the full sample. The middle and bottom panels depict these values for girls and for boys, respectively. Table 2 documents the frequencies of weight restricting behaviors over the two weeks preceding each assessment. The top panel of Table 2 depicts the frequencies for the full sample. Girls' data are presented in the middle panel. The bottom panel contains the data for boys. Differences in frequency of weight restricting behaviors between genders were found at Wave 1 (X^2 = 12.49, p < .05). Girls and boys did not differ on the number of weight restricting behaviors endorsed for Wave 2 and Wave 3.

At each wave, over 18% of all participants reported engaging in at least one weight restricting behavior in the previous two weeks. Rates of weight restricting

decreased over time: for example, at Wave 1, 22.7% of all participants reported at least one form of weight restriction, 21.7% did so at Wave 2, and 18.3% so at Wave 3.

The correlations among the variables are presented in Table 3. All key study variables were significantly intercorrelated, both within and across time points.

Model Tests

The model we tested included the following. (1) autoregressions among each variable; (2) cross-sectional associations between all variables within each wave; (3) pathways to test the key three tests of the study, which were (a) the prediction from depression through thinness expectancies to weight restriction, (b) the prediction from thinness expectancies through depression to weight restriction and (c) prediction from the joint effects of thinness expectancies and depression on subsequent weight restriction, in each case controlling for prior levels of the outcome variable. Additional paths were modeled as well, such as prediction from weight restriction at one wave to thinness expectancies and depression the following wave. Figure 1 depicts this model. Arrows are included for all statistically significant pathways.

Autoregressive Predictive Effects

All autoregressive predictions were significant. For example, depression at Wave 2 was predicted by depression at Wave 1 and depression at Wave 3 was predicted by depression at Wave 2 and depression at Wave 1. The same was true for weight restricting behavior, thinness expectancies, and the interaction between thinness expectancies and depression.

Mediation

As indicated in Figure 1, 8th grade depressive symptoms predicted higher levels of 9th grade expectancies for reinforcement from thinness, which in turn predicted engagement in more weight restricting behaviors in 10th grade. Statistical tests of mediation indicated that the pattern of effects is consistent with the hypothesized mediational process ($z = 4.10$, $p < .001$, $b = .12$). Mediation was full; there was no remaining direct effect of 8th grade depression on 10th grade weight restriction.

As Figure 2 shows, the same set of effects were present for the subsample of girls, and there was again evidence of full mediation ($z = 2.71$, $p < .01$, $b = .09$). For boys, the same pattern of effects was also present, including findings consistent with full mediation ($z = 3.16$, $p < .01$, $b = .14$).

We found no evidence for the reverse mediational process, from 8th grade thinness expectancies through 9th grade depressive symptoms to 10th grade weight restriction. Specifically, in the full sample and in both the girl and boy subsamples, 8th grade thinness expectancies did not predict 9th grade depressive symptomatology. However, 9th grade depressive symptoms did predict 10th grade weight restriction in the full sample (Figure 1), for girls (Figure 2), and for boys (Figure 3).

There was also evidence for an additional mediational process not specified in advance. In the full sample there was an overall indirect effect from Wave 1 weight restriction to Wave 3 weight restriction ($z = 2.26$, $p < 0.01$, $b = .02$). This overall effect included effects both through depression and through thinness expectancies. The specific indirect effect of weight restriction at Wave 1 through depression at Wave 2 to weight restriction at Wave 3 was significant ($z = 2.25$, $p < 0.01$, $b = .02$). Additionally, the

specific indirect effect of weight restriction at Wave 1 through thinness expectancies at Wave 2 to weight restriction at Wave 3 was significant ($z = 2.10$, $p < 0.05$, $b = .01$).

There were differences in these mediation effects by gender. For girls, Wave 2 depressive symptoms appeared to mediate the predictive influence of Wave 1 weight restriction on Wave 3 weight restriction ($z = 1.79$, $p < .05$, $b = .02$), but Wave 2 thinness expectancies did not. The reverse was true for boys. Wave 2 thinness expectancies appeared to mediate the predictive influence of Wave 1 weight restriction on Wave 3 weight restriction ($z = 2.29$, $p < .05$, $b = .03$), but Wave 2 depressive symptoms did not.

Joint Effect of Thinness Expectancies and Depression

We tested whether the interaction of thinness expectancies and depression predicted subsequent weight restriction across each of the two time lags. The Wave 1 interaction did predict Wave 2 weight restriction, above and beyond prior weight restriction ($p < 0.01$, $b = .12$). The left panel of Figure 4 depicts these interactions for the full sample and both genders. The relationship between thinness expectancies and weight restriction was stronger at higher levels of depression. The same relationship was present from Wave 2 to Wave 3 ($p < 0.01$, $b = .16$). The right panel of Figure 4 demonstrates these interactions for the full sample and for each gender in particular.

Additional Pathways of Note

We call attention to three other types of predictive effects that were present in our model test. The first are pathways that are consistent with our model but not direct tests of it. For example, 8th grade thinness expectancies and depression both predicted number of weight restricting behaviors in 9th grade, and the same was true with respect to prediction from 9th grade to 10th grade. Second, 8th grade weight restriction predicted 9th

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grade depressive symptoms and thinness expectancies, and 9th grade weight restriction predicted 10th grade depressive symptoms. Although the focus of the current study was on prediction of weight restricting behaviors, it is noteworthy that the behaviors themselves predicted subsequent increases in the risk factors. Third, there were some prospective paths between depressive symptoms or thinness expectancies and their interaction. For example, 8th grade depressive symptoms predicted the thinness expectancy by depressive symptom interaction in 9th grade. In addition, the interaction in 8th grade predicted both depressive symptoms and thinness expectancies in 9th grade.

Logistic Regression Odds Ratio

To understand the magnitude of the associations in the model, we computed odds ratios for each predictor with weight restriction at Waves 2 and 3. Table 4 includes all odds ratios for all variables that significantly predicted weight restriction at Wave 2. For each one unit increase in Wave 1 depression, participants were 3.88 times more likely to engage in one more weight restricting behavior at Wave 2. For each one unit increase in thinness expectancies at Wave 1, participants were 23% more likely to engage in one more weight restricting behavior at Wave 2. For each additional weight restricting behavior engaged in at Wave 1, participants were 40% more likely to be one unit higher on Wave 2 weight restriction.

Similarly, for every one unit increase in Wave 2 depression, individuals were 54% more likely to engage in one more weight restricting behavior at Wave 2. For each unit increase in Wave 2 thinness expectancies, participants were 30% more likely to engage in one more weight restricting behavior at Wave 2. Additionally, for each one unit increase in weight restriction at Wave 2, participants were 2.04 times more likely to engage in one

more weight restricting behavior at Wave 3. There was an effect of Wave 1 weight restriction beyond that of Wave 2 weight restriction. For each one unit increase Wave 1 weight restriction, participants were 33% more likely to be one unit higher on Wave 3 weight restriction.

Table 3.1: Descriptive Statistics of Key Variables for Full Sample and by Gender

Total Sample	Wave 1	Wave 2	Wave 3
Mean (SD)			
Weight Restriction	0.48 (1.09)	0.33 (0.75)	0.28 (0.70)
Depression	1.70 (0.45)	1.82 (0.48)	1.84 (0.49)
TE	2.39 (1.59)	2.62 (1.55)	2.67 (1.62)
TE x Dep	2.04 (0.48)	2.09 (0.57)	2.16 (0.54)
Girls	Wave 1	Wave 2	Wave 3
Mean (SD)			
Weight Restriction	0.53 (1.17)	0.32 (0.75)	0.29 (0.73)
Depression	1.70 (0.44)	1.83 (0.48)	1.83 (0.48)
TE	2.40 (1.57)	2.61 (1.51)	2.70 (1.62)
TE x Dep	0.27 (1.00)	0.27 (0.93)	0.27 (0.84)
Boys	Wave 1	Wave 2	Wave 3
Mean (SD)			
Weight Restriction	0.42 (1.01)	0.34 (0.76)	0.27 (0.68)
Depression	1.69 (0.45)	1.82 (0.47)	1.85 (0.49)
TE	2.39 (1.60)	2.62 (1.58)	2.64 (1.62)
TE x Dep	0.25 (1.04)	0.29 (0.99)	0.26 (1.00)

Note: TE = Thinness expectancies; TE x Dep = the interaction of thinness expectancies and depression.
Top panel: Mean and standard deviation for all participants. N = 1907.
Middle panel: Mean and standard deviation for girls. N = 936.
Bottom panel: Mean and standard deviation for boys. N = 971.

Table 3.2: Prevalence of Weight Restricting Behaviors at Each Wave for the Full Sample and by Gender

Number of weight restricting behaviors in the last 14 days	Total Sample		
	Wave 1	Wave 2	Wave 3
Frequency (%) endorsing weight restricting behaviors			
0	1475 (77.3)	1494 (78.3)	1558 (81.7)
1	204 (10.7)	273 (14.3)	230 (12.1)
2	86 (4.5)	87 (4.6)	73 (3.8)
3	83 (4.4)	37 (1.9)	32 (1.7)
4	8 (0.4)	7 (0.4)	8 (0.4)
5	51 (2.7)	9 (0.5)	6 (0.3)
Chi-Square	12.49*	6.84	2.31

Number of weight restricting behaviors in the last 14 days	Girls		
	Wave 1	Wave 2	Wave 3
Frequency (%) endorsing weight restricting behaviors			
0	717 (76.6)	741 (79.2)	763 (81.5)
1	86 (9.2)	127 (13.6)	111 (11.9)
2	48 (5.1)	38 (4.1)	37 (4.0)
3	51 (5.4)	24 (2.6)	16 (1.7)
4	5 (0.5)	2 (0.2)	6 (0.6)
5	29 (3.1)	4 (0.4)	3 (0.3)

Number of weight restricting behaviors in the last 14 days	Boys		
	Wave 1	Wave 2	Wave 3
Frequency (%) endorsing weight restricting behaviors			
0	758 (78.1)	753 (77.5)	795 (81.9)
1	118 (12.2)	146 (15.0)	119 (12.3)
2	38 (3.9)	49 (5.0)	36 (3.7)
3	32 (3.3)	13 (1.3)	16 (1.6)
4	3 (0.3)	5 (0.5)	2 (0.2)
5	22 (2.7)	5 (0.5)	3 (0.3)

Note: Levels of weight restricting engagement are represented by percentages of individuals who engaged in weight restricting behaviors of the count variable. * $p < 0.05$. Top Panel: Frequencies of weight restricting behaviors for the full sample. Difference in frequency of weight restricting behaviors between genders were tested using chi-square analyses. Middle Panel: Frequencies of weight restricting behaviors for girls. Bottom Panel: Frequencies of weight restricting behaviors for boys.

Table 3.3: Bivariate Correlations Between Key Study Variables

	WR1	WR2	WR3	Dep1	Dep2	Dep3	TE1	TE2	TE3	TE1xDep 1	TE2xDep 2
WR 1											
WR 2	.20										
WR 3	.21	.39									
Dep 1	.11	.30	.19								
Dep 2	.14	.45	.26	.54							
Dep 3	.14	.30	.33	.43	.53						
TE 1	.20	.22	.19	.37	.23	.23					
TE 2	.16	.35	.26	.33	.38	.30	.56				
TE 3	.18	.24	.30	.25	.26	.33	.48	.56			
TE1xDep1	.20	.19	.15	.42	.20	.19	.36	.20	.17		
TE2xDep2	.12	.35	.16	.25	.38	.21	.12	.26	.12	.31	
TE3xDep3	.11	.17	.21	.17	.21	.25	.15	.12	.22	.29	.32

Note: WR 1, WR 2, WR 3 = weight restriction at Waves 1, 2, 3; Dep 1, Dep 2, Dep 3 = depression scores at Waves 1, 2, 3; TE 1, TE 2, TE 3 = thinness expectancies scores at Waves 1, 2, 3; TE1 x Dep1, TE2 x Dep2, TE3 x Dep3 = the interaction of thinness expectancies scores and depression scores at Waves 1, 2, 3. All correlations presented represent significant results (p < .001).

Table 3.4: Magnitude of Prediction of Weight Restriction

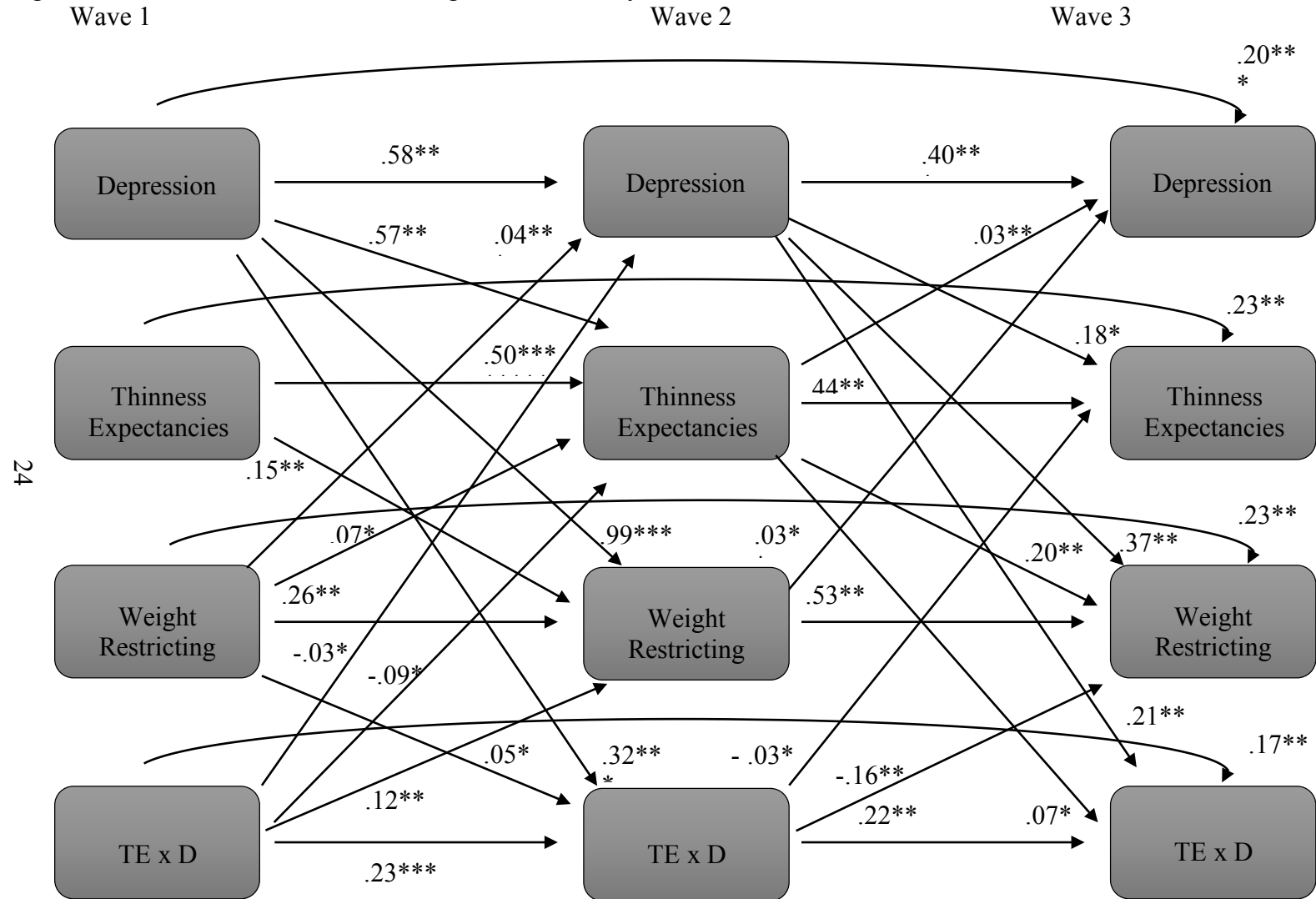|	Odds Ratio
Wave 2 Weight Restriction	
Dep 1	3.88***
TE 1	1.23***
WR 1	1.40***
Wave 3 Weight Restriction	
Dep 2	1.54*
TE 2	1.30***
WR 2	2.04***
WR 1	1.33***

Note: Dep = depression; TE = thinness expectancies; WR = weight restriction; each number following the variable represents the wave in which the data was collected (i.e., Dep 2 = Depression, Wave 2). * $p < 0.05$, ***$p < 0.001$.

Table 3.5: Model Fit Indices

Model	AIC	BIC	Sample BIC
Overall	50695.99	51123.60	50878.97
Girls	24643.33	25016.14	24771.59
Boys	26034.42	26410.05	26165.50

Figure 3.1: Full Structural Model with Significant Pathways

Wave 1   Wave 2   Wave 3

.20***

Depression → Depression: .58**
Depression → Depression: .40**

.57**   .04**   .03**

Thinness Expectancies: .50***

.23**

.18*

Thinness Expectancies → Thinness Expectancies: .44**

.15**

.07*   .99***   .03*   .20**   .37**   .23**

.26**

Weight Restricting → Weight Restricting: .53**

-.03*   -.09*   .05*   .32**   -.03*   -.16**   .21**   .17**

.12**

TE x D → TE x D: .22**   .07*

.23***

Note: TE x D = the interaction between thinness expectancies and depression. N = 1906, *p < .05, **p < .01, ***p< .001
Covariation among all variables cross-sectionally was modeled but not included in figure for clarity.

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Figure 3.2: Structural Model with Significant Pathways for Girls
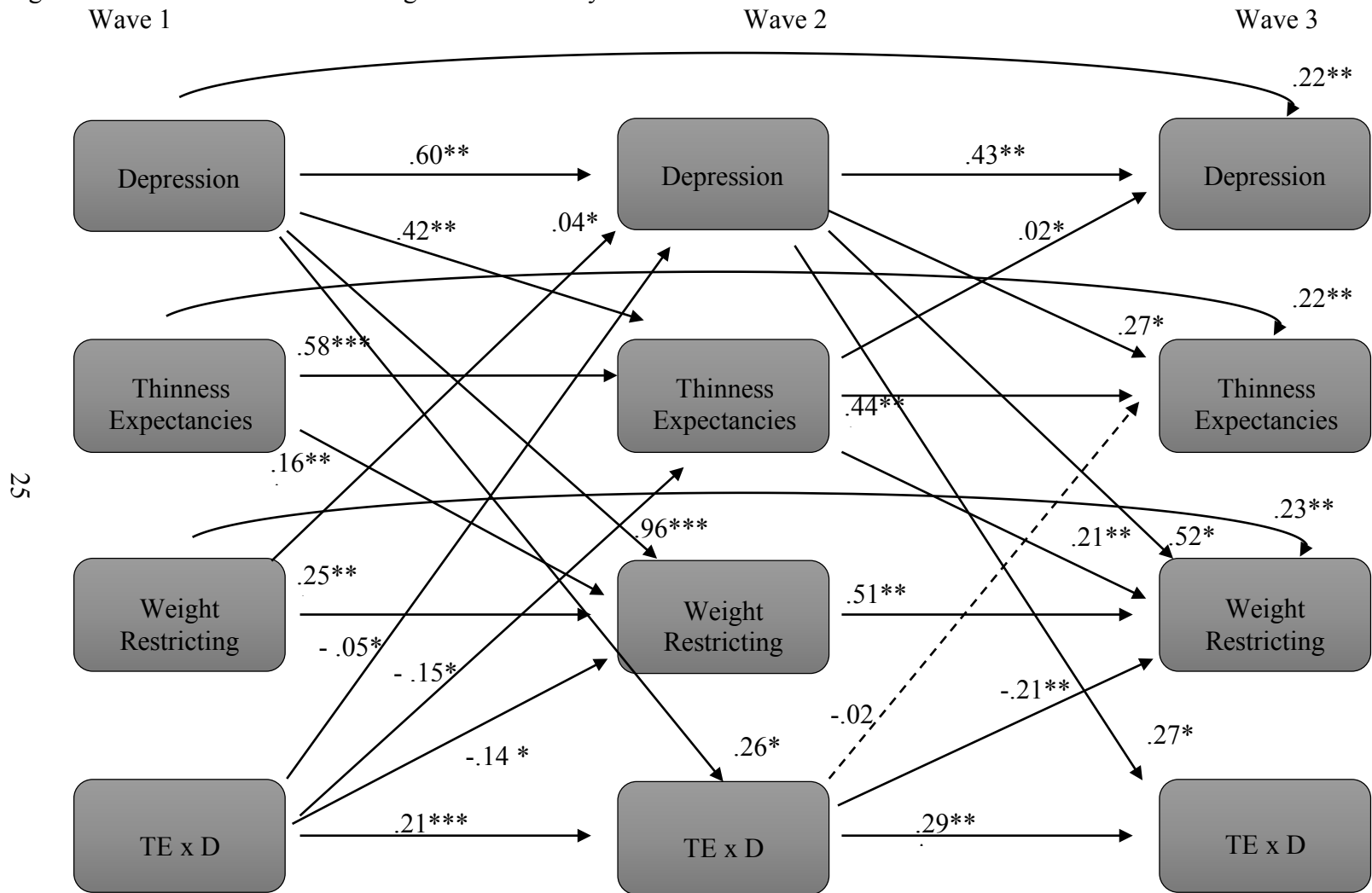
Note: TE x D = the interaction between thinness expectancies and depression. N = 1906, *p < .05, **p < .01, ***p< .001
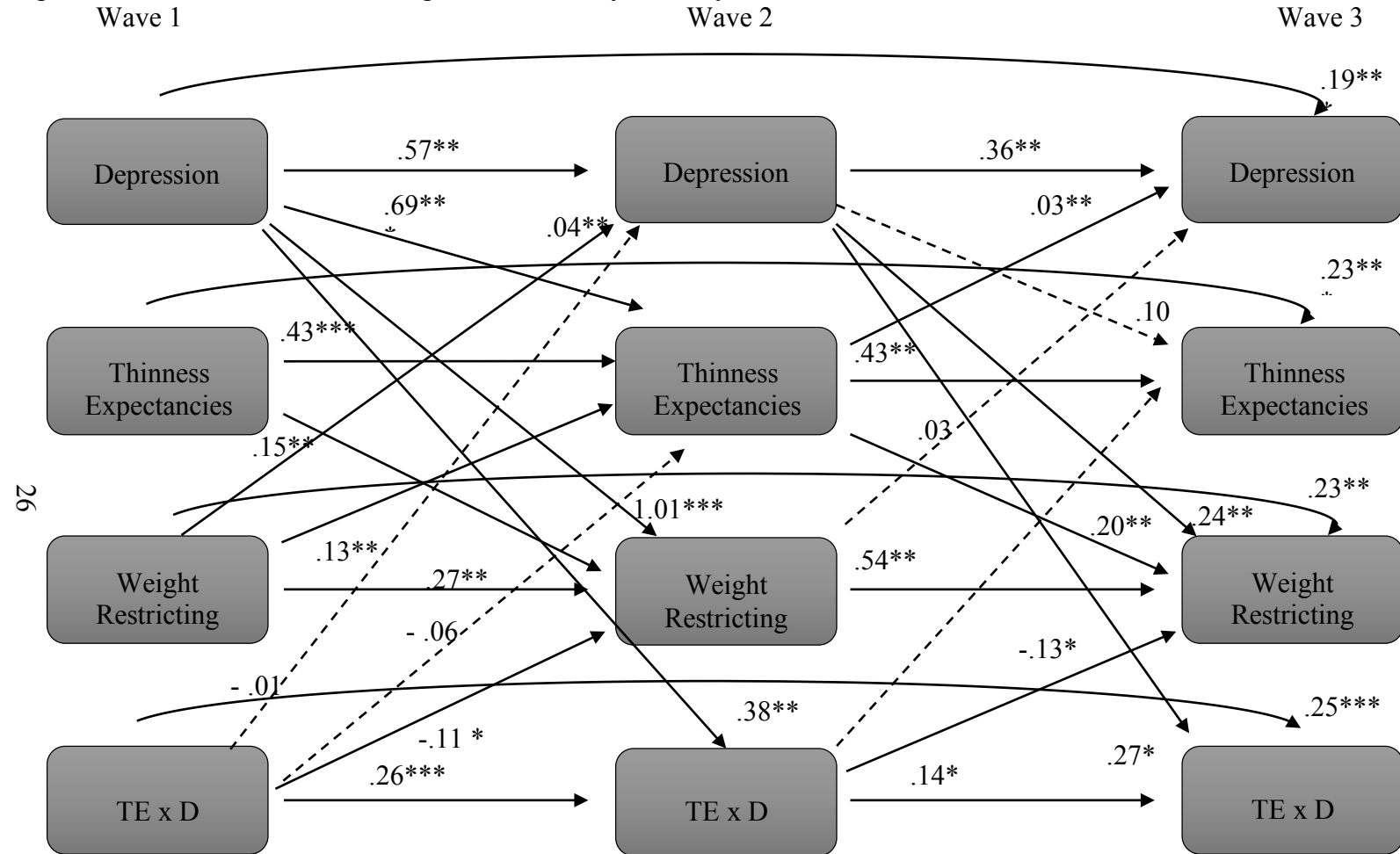Covariation among all variables cross-sectionally was modeled but not included in figure for clarity. Dotted lines represent pathways that
were significant in the overall model, but were not significant in this specific model.

Figure 3.3: Structural Model with Significant Pathways for Boys

Note: TE x D = the interaction between thinness expectancies and depression. N = 1906, *p < .05, **p < .01, ***p< .001
Covariation among all variables cross-sectionally was modeled but not included in figure for clarity. Dotted lines represent pathways that were significant in the overall model, but were not significant in this specific model.

Figure 3.4: Plot of the Interaction between Thinness Expectancies and Depression on Weight Restriction Behaviors
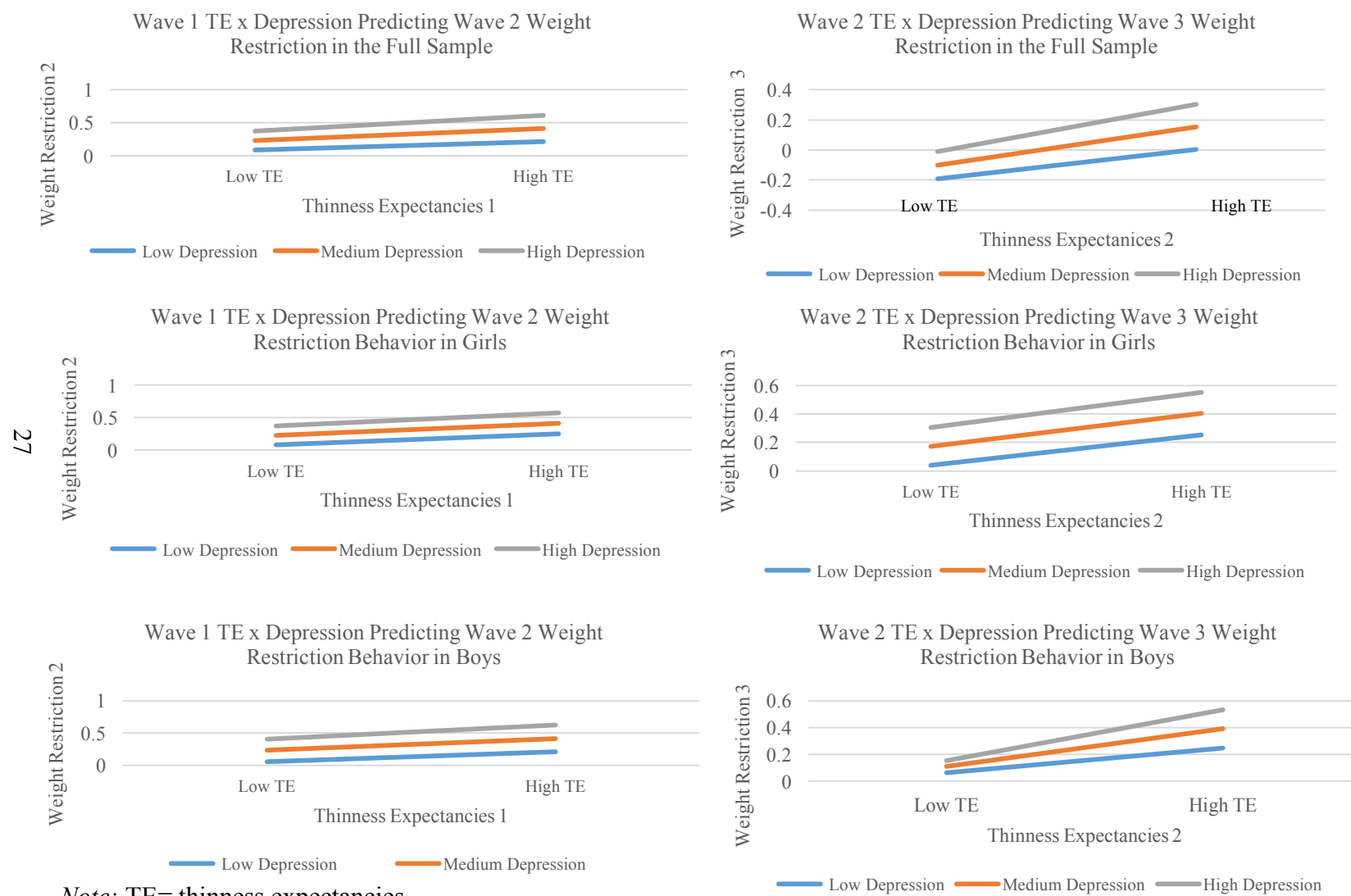
Note: TE= thinness expectancies.

Discussion

Building on prior work showing that both depressive symptomatology and expectancies for reinforcement from thinness predict subsequent disordered eating behavior, the current study investigated three possible transactional relationships between those two risk factors in the prediction of weight restriction among adolescents. Specifically, we tested if depression predicted weight restricting behaviors through its predictive influence on thinness expectancies, over the transitional period from middle school to high school. We also tested if there was a mediational process occurring where thinness expectancies predicted subsequent depression which predicted weight restriction behaviors. Third, we tested whether the joint effect of elevations on the two risk factors predicted subsequent weight restriction.

The first key finding of this study concerned the pathway of depression predicting weight restricting behaviors through its predictive influence on thinness expectancies. Our findings were consistent with a mediational process such that depression in eighth grade contributed to greater endorsement of expectancies for overgeneralized life improvement from thinness in the ninth grade, and those expectancies in turn contributed to engagement in more forms of weight restriction behaviors in tenth grade. This process was true for girls and boys. No differences between gender were observed.

The possibility that one mechanism by which a transdiagnostic risk factor contributes to weight restriction is through its influence on an eating disorder-specific risk factor is important both theoretically and practically. The findings may also help explain why only a subset of individuals strongly endorse thinness reinforcement expectancies. From a theoretical perspective, it may be that depressive symptoms motivate individuals to look for ways to improve their lives, and this motivation can lead

to a stronger endorsement of the societal message that being thin will result in an overgeneralized life improvement.

Clinically, these findings are of importance as well. Adolescents experiencing depression are more likely to strongly endorse high-risk thinness expectancies and engage in weight restriction behaviors. Given past findings that weight restriction behaviors are associated with numerous harmful health outcomes, it may be important to monitor youths' depressive symptoms and expectancies of thinness. Future research is necessary to develop targeted interventions to disrupt this process.

Our findings did not support the reverse hypothesis, that thinness expectancies predict depressive symptoms which potentiate weight restricting behaviors. In contrast to this negative finding, Stice (2001) found that internalization of the thin ideal prospectively predicted negative affect in a similar age cohort. Of course, depressive symptoms are not isomorphic with negative affect, so it may well be that the downstream negative impact of thinness expectancy endorsement is specific to negative affect, rather than depressive symptoms in total. Alternatively, perhaps a longer period of time experiencing negative affect following failure to meet the thin ideal and achieve the expected goals of thinness could result in increases in depressive experience. Because the current study did not follow youth beyond 10th grade, it could not address this possibility.

We also observed an overall indirect effect from weight restriction at the end of middle school to weight restriction in 10th grade. However, the specific mediational process differed between genders. In girls, we observed these significant indirect effects occurred only through depressive symptoms. This effect was not supported in boys. Instead, the effects were mediated by thinness expectancies. Perhaps girls experience

depression as a more motivating factor to engage in weight restricting behavior as means of avoiding their internal, depressed feelings. On the other hand, boys may be more likely to find their expectancies for reinforcement from thinness to be a motivation for weight restricting behaviors.

In addition to these finding supporting our transactional model of risk, we also found that the joint effect of depression and thinness expectancies in 8th and 9th grade predicts subsequent increases in the number of weight restricting behaviors youth endorse. The relationship between expectancies for reinforcement from thinness and weight restricting behaviors is stronger at higher levels of depression. This finding is consistent with previous work that has demonstrated that depressed mood moderates the relationship between the drive for thinness and eating disorder symptoms in college students (Grossbard, Atkins, Geisner, & Larimer, 2013). It thus appears that transdiagnostic and disorder-specific risk can jointly increase risk. Clinicians are likely to find it necessary to address both types of risk processes in their work with weight restricting adolescents.

Although a large portion of research has focused exclusively on risk for women, the risk processes examined in this study appeared, overall, to be similar between genders. These similarities in risk across gender indicates that risk for weight restricting behaviors in boys necessitates further research and more clinical attention.

The results of this study should be considered in light of its limitations. First, we assessed all risk and behavioral symptoms reporting using self-report questionnaires. Although there is good evidence for the validity and reliability of the measures used, an interview assessment may have been particularly useful in a sample of youth to provide

additional clarification and increase precision. Second, the model driving the current research is causal in nature. The findings of this prospective correlational study are consistent with, but not proof of, the underlying causal model. Additionally, while our risk model was constructed by a priori theory, it is significant to note that a good fit SEM model does not preclude the potential for other models to fit the data as well (Tomarken & Waller, 2003). Third, the questionnaire used to assess weight restriction (i.e., the EDE-Q) asked participants to report on their engagement in these behaviors over the two weeks preceding the assessment. Similarly, depression levels assessed by the CES-D asked the participants to respond considering only the week prior to the assessment. Scores on our measures thus reflected very recent experiences and not life-time experiences. Finally, since we grouped the purging and nonpurging behaviors together to create our weight restriction variable, are not able to distinguish if our findings more accurately representative of one group over the other.

Conclusion

In summary, weight restricting behaviors appear to be present among youth and are of obvious concern. Transactions between depressive symptoms and thinness expectancies across the transition from middle school to high school seem to increase risk of engaging in more of these behaviors. We hope this described model can further contribute to the understanding of the etiology of weight restricting behaviors. It is both critical and possible to determine the risk process for adolescent weight restricting behaviors to better inform clinical prevention and intervention efforts.

References

Allen, K. L., Byrne, S. M., Oddy, W. H., & Crosby, R. D. (2013)b. DSM–IV–TR and

   DSM-5 eating disorders in adolescents: Prevalence, stability, and psychosocial

   correlates in a population-based sample of male and female adolescents. *Journal

   of Abnormal Psychology*, *122*(3), 720-732.

Allen, K. L., Crosby, R. D., Oddy, W. H., & Byrne, S. M. (2013)a. Eating disorder

   symptom trajectories in adolescence: effects of time, participant sex, and early

   adolescent depressive symptoms. *Journal of Eating Disorders*, *1*(1), 1-32.

Angold, A. (1993). Depressive comorbidity in children and adolescents: Empirical,

   theoretical, and methodological issues. *The American Journal of

   Psychiatry., 150*(12), 1779-1791.

Annus, A. M., Smith, G. T., & Masters, K. (2008). Manipulation of thinness and

   restricting expectancies: Further evidence for a causal role of thinness and

   restricting expectancies in the etiology of eating disorders. *Psychology of

   Addictive Behaviors*, *22*(2), 278-287.

Arcelus, J., Mitchell, A. J., Wales, J., & Nielsen, S. (2011). Mortality rates in patients

   with anorexia nervosa and other eating disorders: a meta-analysis of 36

   studies. *Archives of General Psychiatry*, *68*(7), 724-731.

Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In. KA,

   Bollen, JS Long,(Eds.), Testing structural equation models (pp. 136-162).

   Newbury Park, CA: Sage.

Bulik, C. M. (2002). Eating disorders in adolescents and young adults. *Child and

   Adolescent Psychiatric Clinics of North America*, *11*(2), 201-218.

Carter, J. C., Stewart, D. A., & Fairburn, C. G. (2001). Eating disorder examination questionnaire: norms for young adolescent girls. *Behaviour Research and Therapy*, *39*(5), 625-632.

Chamay-Weber, C., Narring, F., & Michaud, P. A. (2005). Partial eating disorders among adolescents: A review. *Journal of Adolescent Health*, *37*(5), 416-426.

Combs, J. L., Smith, G. T., Flory, K., Simmons, J. R., & Hill, K. K. (2010). The acquired preparedness model of risk for bulimic symptom development. *Psychology of Addictive Behaviors*, *24*(3), 475-486.

Cooper, Z., & Fairburn, C. G. (1987). The eating disorder examination: A semi-structured interview for the assessment of the specific psychopathology of eating disorders. *International Journal of Eating Disorders*, *6*(1), 1-8.

Cooper, M. J., & Fairburn, C. G. (1993). Demographic and clinical correlates of selective information-processing in patients with bulimia nervosa. *International Journal of Eating Disorders,* 13(1), 109-116.

Culbert, K. M., Racine, S. E., & Klump, K. L. (2015). Research Review: What we have learned about the causes of eating disorders–a synthesis of sociocultural, psychological, and biological research. *Journal of Child Psychology and Psychiatry*, *56*(11), 1141-1164.

Davis, H. A., Guller, L., & Smith, G. T. (2016). Developmental trajectories of compensatory exercise and fasting behavior across the middle school years. *Appetite*, *107*, 330-338.

Davis, H. A., Holland, L. A., & Keel, P. K. (2014). A preliminary examination of a

    nonpurging compensatory eating disorder. *International Journal of Eating*

    Disorders, *47*(3), 239-243.

Davis, H. A., Ortiz, A. M. L., & Smith, G. T. (2017). The occurrence and covariation of

    binge eating and compensatory behaviors across early to mid-

    adolescence. *Journal of Pediatric Psychology*, jsx113,

    https://doi.org/10.1093/jpepsy/jsx113.

Fairburn, C. G., & Beglin, S. J. (1994). Assessment of eating disorders: Interview or self-

    report questionnaire?. *International journal of eating disorders*, *16*(4), 363-370.

Fairburn, C. G., & Cooper, Z. (1993). The Eating Disorder Examination. In C. G.

    Fairburn, & G. T. Wilson (Eds.), Binge eating: Nature, assessment, and treatment.

    12 (pp. 317–360). New York: Guilford Press.

Ferreiro, F., Seoane, G., & Senra, C. (2012). Gender-related risk and protective factors

    for depressive symptoms and disordered eating in adolescence: A 4-year

    longitudinal study. *Journal of Youth and Adolescence*, *41*(5), 607-622.

Field, A. E., Camargo, C. A., Taylor, C. B., Berkey, C. S., & Colditz, G. A. (1999).

    Relation of peer and media influences to the development of purging behaviors

    among preadolescent and adolescent girls. *Archives of Pediatrics & Adolescent*

    Medicine, *153*(11), 1184-1189.

Grossbard, J. R., Atkins, D. C., Geisner, I. M., & Larimer, M. E. (2013). Does depressed

    mood moderate the influence of drive for thinness and muscularity on eating

    disorder symptoms among college men? *Psychology of Men & Masculinity, 14*(3),

    281-287.

Hohlstein, L. A., Smith, G. T., & Atlas, J. G. (1998). An application of expectancy theory

  to eating disorders: Development and validation of measures of eating and dieting

  expectancies. *Psychological Assessment*, *10*(1), 49-58.

Holland, L. A., Brown, T. A., & Keel, P. K. (2014). Defining features of unhealthy

  exercise associated with disordered eating and eating disorder

  diagnoses. *Psychology of Sport and Exercise*, *15*(1), 116-123.

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure

  analysis: Conventional criteria versus new alternatives. *Structural Equation*

  Modeling: A Multidisciplinary Journal, *6*(1), 1-55.

Hudson, J. I., Hiripi, E., Pope, H. G., & Kessler, R. C. (2007). The prevalence and

  correlates of eating disorders in the National Comorbidity Survey

  Replication. *Biological Psychiatry*, *61*(3), 348-358.

Johnson, J. G., Cohen, P., Kotler, L., Kasen, S., & Brook, J. S. (2002). Psychiatric

  disorders associated with risk for the development of eating disorders during

  adolescence and early adulthood. *Journal of Consulting and Clinical*

  Psychology, *70*(5), 1119-1128.

Kline, R. (2005). Principles and practice of structural equation modelling. New York:

  USA.

Krowchuk, D. P., Kreiter, S. R., Woods, C. R., Sinal, S. H., & DuRant, R. H. (1998).

  Problem dieting behaviors among young adolescents. *Archives of Pediatrics &*

  Adolescent Medicine, *152*(9), 884-888.

LePage, M. L., Crowther, J. H., Harrington, E. F., & Engler, P. (2008). Psychological correlates of fasting and vigorous exercise as compensatory strategies in undergraduate women. *Eating Behaviors*, *9*(4), 423-429.

Lepowsky, A. L. V. (2014). *Evaluation of multiple factors that influence negative weight control behaviors among adolescents in the United States* (Doctoral dissertation, Walden University).

Lewinsohn, P. M., Striegel-Moore, R. H., & Seeley, J. R. (2000). Epidemiology and natural course of eating disorders in young women from adolescence to young adulthood. *Journal of the American Academy of Child & Adolescent Psychiatry*, *39*(10), 1284-1292.

Liechty, J. M., & Lee, M. J. (2013). Longitudinal predictors of dieting and disordered eating among young adults in the US. *International Journal of Eating Disorders*, *46*(8), 790-800.

Luce, K. H., & Crowther, J. H. (1999). The reliability of the eating disorder examination—Self-report questionnaire version (EDE-Q). *International Journal of Eating Disorders*, *25*(3), 349-351.

MacBrayer, E. K., Smith, G. T., McCarthy, D. M., Demos, S., & Simmons, J. (2001). The role of family of origin food-related experiences in bulimic symptomatology. *International Journal of Eating Disorders*, *30*(2), 149-160.

McCarthy, M. (1990). The thin ideal, depression and eating disorders in women. *Behaviour Research and Therapy, 28*(3), 205–215.

Mond, J. M., & Calogero, R. M. (2009). Excessive exercise in eating disorder patients and in healthy women. *Australian & New Zealand Journal of Psychiatry*, *43*(3), 227-234.

Mond, J. M., & Hay, P. J. (2007). Functional impairment associated with bulimic behaviors in a community sample of men and women. *International Journal of Eating Disorders*, *40*(5), 391-398.

Mond, J. M., Hay, P. J., Rodgers, B., Owen, C., & Beumont, P. J. (2004). Validity of the Eating Disorder Examination Questionnaire (EDE-Q) in screening for eating disorders in community samples. *Behaviour Research and Therapy*, *42*(5), 551-567.

Mond, J., Hay, P., Rodgers, B., Owen, C., Crosby, R., & Mitchell, J. (2006). Use of extreme weight control behaviors with and without binge eating in a community sample: Implications for the classification of bulimic-type eating disorders. *International Journal of Eating Disorders*, *39*(4), 294-302.

Muthén L.K., & Muthén, B.O. Mplus: The comprehensive modeling program for applied researchers. User's guide. 3. Los Angeles: Muthén & Muthén; 2004.

Neumark-Sztainer, D. R., Wall, M. M., Guo, J., Story, M. T., Haines, J. I., & Eisenberg, M. E. (2006). Obesity, disordered eating, and eating disorders in a longitudinal study of adolescents: how do dieters fare 5 years later?. *Journal of the American Dietetic Association*, *106*(4), 559-568.

Pearson, C. M., Combs, J. L., Zapolski, T. C., & Smith, G. T. (2012). A longitudinal transactional risk model for early eating disorder onset. *Journal of Abnormal Psychology*, *121*(3), 707-718.

Pearson, C. M., Wonderlich, S. A., & Smith, G. T. (2015). A risk and maintenance model
for bulimia nervosa: From impulsive action to compulsive
behavior. *Psychological Review*, *122*(3), 516-535.

Petersen, A. C., & Taylor, B. (1980). The biological approach to adolescence: Biological
change and psychological adaptation. In Adelson, J. (ed.), *Handbook of
Adolescent Psychology*, Wiley, New York, pp. 117–155.

Radloff, L. S. (1977). The CES-D scale: A self-report depression scale for research in the
general population. *Applied Psychological Measurement*, *1*(3), 385-401.

Radloff, L. S. (1991). The use of the Center for Epidemiologic Studies Depression Scale
in adolescents and young adults. *Journal of Youth and Adolescence*, *20*(2), 149-
166.

Rodgers, R. F., Paxton, S. J., & Chabrol, H. (2010). Depression as a moderator of
sociocultural influences on eating disorder symptoms in adolescent females and
males. *Journal of Youth and Adolescence*, *39*(4), 393-402.

Rutter, M. (1994). Beyond longitudinal data: Causes, consequences, changes and
continuity. *Journal of Consulting and Clinical Psychology, 62*(5), 928–940.

Saluja, G., Iachan, R., Scheidt, P. C., Overpeck, M. D., Sun, W., & Giedd, J. N. (2004).
Prevalence of and risk factors for depressive symptoms among young
adolescents. *Archives of Pediatrics & Adolescent Medicine, 158*(8), 760-765.

Silk, J. S., Steinberg, L., & Morris, A. S. (2003). Adolescents' emotion regulation in daily
life: Links to depressive symptoms and problem behavior. *Child
Development*, *74*(6), 1869-1880.

Simmons, J. R., Smith, G. T., & Hill, K. K. (2002). Validation of eating and dieting

expectancy measures in two adolescent samples. *International Journal of Eating

Disorders*, *31*(4), 461-473.

Sinton, M. M., & Birch, L. L. (2005). Weight status and psychosocial factors predict the

emergence of dieting in preadolescent girls. *International Journal of Eating

Disorders*, *38*(4), 346-354.

Smith, G. T., Simmons, J. R., Flory, K., Annus, A. M., & Hill, K. K. (2007). Thinness

and eating expectancies predict subsequent binge-eating and purging behavior

among adolescent girls. *Journal of Abnormal Psychology*, *116*(1), 188-197.

Spear, L. P. (2000). The adolescent brain and age-related behavioral manifestations.

Neuroscience and Behavioral Reviews, 24(4), 417–463.

Stice, E., & Agras, W. S. (1998). Predicting onset and cessation of bulimic behaviors

during adolescence: A longitudinal grouping analysis. *Behavior Therapy*, *29*(2),

257-276.

Stice, E., & Bearman, S. (2001). Body-image and eating disturbances prospectively

predict increases in depressive symptoms in adolescent girls: A growth curve

analysis. *Developmental Psychology., 37*(5), 597-607.

Stice, E., Burton, E. M., Shaw, H. (2004). Prospective relations between bulimic

pathology, depression and substance abuse: Unpacking comorbidity in adolescent

girls. *Journal of Consulting and Clinical Psychology,72*(1), 62-71.

Stice, E., Killen, J. D., Hayward, C., & Taylor, C. B. (1998). Age of onset for binge

eating and purging during late adolescence: a 4-year survival analysis. *Journal of

Abnormal Psychology*, *107*(4), 671-675.

Stice, E., Marti, C. N., Shaw, H., & Jaconis, M. (2009). An 8-year longitudinal study of
the natural history of threshold, subthreshold, and partial eating disorders from a
community sample of adolescents. *Journal of Abnormal Psychology*, *118*(3), 587-
597.

Stiles-Shields, E. C., Goldschmidt, A. B., Boepple, L., Glunz, C., & Le Grange, D.
(2011). Driven exercise among treatment-seeking youth with eating
disorders. *Eating Behaviors*, *12*(4), 328-331.

Szmukler, G. I. (1987). Some comments on the link between anorexia nervosa and
affective disorder. *International Journal of Eating Disorders*, *6*(2), 181-189.

Tomarken, A. J., & Waller, N. G. (2003). Potential problems with" well fitting"
models. *Journal of Abnormal Psychology*, *112*(4), 578-598.

Van Son, G. E., Van Hoeken, D., Bartelds, A. I., Van Furth, E. F., & Hoek, H. W. (2006).
Time trends in the incidence of eating disorders: a primary care study in the
Netherlands. *International Journal of Eating Disorders*, *39*(7), 565-569.

Wade, T.D., Keski-Rahkonnen, A., & Hudson, J. (2010). Epidemiology of eating
disorders. In M. Tsuang, & M. Tohen (Eds.), *Textbook in Psychiatric
Epidemiology*. New York: Wiley.

Wade, T. D., & O'shea, A. (2015). DSM-5 unspecified feeding and eating disorders in
adolescents: What do they look like and are they clinically
significant?. *International Journal of Eating Disorders*, *48*(4), 367-374.

Wade, T. D., Wilksch, S. M., & Lee, C. (2012). A longitudinal investigation of the
impact of disordered eating on young women's quality of life. *Health
Psychology*, *31*(3), 352-359.

Zarychta, K., Luszczynska, A., & Scholz, U. (2014). The association between automatic thoughts about eating, the actual–ideal weight discrepancies, and eating disorders symptoms: a longitudinal study in late adolescence. *Eating and Weight Disorders*, *19*(2), 199–207.

Vita

1. Franciscan University of Steubenville (B.A., Psychology)
2. Jesse G. Harris Psychological Services Center: Student Therapist; University of Kentucky Counseling Center Practicum Student
3. University of Kentucky Lyman T. Johnson Fellowship; Franciscan University of Steubenville Baconian Society Award; Franciscan University of Steubenville Outstanding Scholar in Experimental Psychology Award; Franciscan University of Steubenville Psi Chi Honor Society Award; Franciscan University of Steubenville
4. Davis, H. A., **Ortiz, A. M. L.**, & Smith, G. T. (2017). The occurrence and covariation of binge eating and compensatory behaviors across early to mid-adolescence. *Journal of Pediatric Psychology*. DOI: 10.1093/jpepsy/jsx113.
   Davis, H. A., **Ortiz, A. M.**, D'Agostino, A. R., & Smith, G. T. (2016). A two-stage risk model for bulimic behavior. In N. Morton (Ed.), *Eating Disorders: Prevalence, Risk Factors and Treatment Options*. (pp. 97-120). New York: Nova Science Publishers, Inc.

Anna Marie Lilia Ortiz