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## Body Dissatisfaction and Symptoms of Bulimia Nervosa Prospectively Predict Suicide Ideation in Adolescents

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### Abstract

**Objective:** Symptoms of eating disorders have been established as significant concurrent correlates with suicide ideation and behaviors in adolescent samples, but very few studies have examined eating disorder symptoms as prospective risk factors for suicide. The current study examined eating disorder symptoms as prospective risk factors for suicide ideation in an unselected community sample of adolescents.

**Method:** Data were collected from 436 adolescents in middle and high school at baseline and 6- and 12-month follow-ups. Adolescents completed self-report measures assessing eating disorder symptoms and suicide ideation and behaviors at each time point during school hours.

**Results:** Regression analyses found that body dissatisfaction was a significant prospective predictor of suicide ideation severity at the 6- and 12-month follow-ups, symptoms of bulimia nervosa (bingeing and purging) predicted suicide ideation severity at the 12-month follow-up only, and symptoms of anorexia nervosa (drive for thinness and restricting) were not significant predictors of suicide ideation at either follow-up. Exploratory analyses found the same pattern of results for the sample of girls only, while no significant predictors were found for boys only.

**Discussion:** This is the first longitudinal study of disordered eating and suicide ideation in American adolescents. Symptoms of bulimia nervosa and body dissatisfaction seem to be true risk factors for suicidal ideation. The current study demonstrates the importance of disordered eating behaviors in the development of suicidal ideation in adolescents, particularly for adolescent girls.

### Keywords

eating disorders; body dissatisfaction; bulimia nervosa; suicide ideation; adolescents; longitudinal

Suicide has become an increasingly prevalent public health concern, with especially elevated rates observed among individuals with eating disorders (Crow, Swanson, le Grange, Feig, & Merikangus, 2014; Forrest, Zuromski, Dodd, & Smith, 2017). Furthermore, suicide accounts

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<sup>1</sup>All analyses were also run with depression scores from baseline as a covariate (total score from the Reynolds Adolescent Depression Scale – Second Edition; Reynolds, 2002). The results did not change substantially, and all significant and non-significant variables remained as such. Therefore, only results from the original analyses that did not include depression as a covariate are included in the main document.

for the second greatest proportion of deaths from anorexia nervosa, surpassed only by medical complications from the illness (Arcelus, Mitchell, Wales, & Neilsen, 2011). Past meta-analyses have found that those with anorexia nervosa are between 18 and 31 times more likely to attempt suicide than healthy controls (Keshaviah et al., 2014; Preti, Rocchi, Sisti, Camboni, & Miotto, 2011). Although suicidal behavior has been found to be elevated across all eating disorders as compared to the general population, bulimia nervosa and the binge-purge subtype of anorexia nervosa consistently report higher rates of suicidal behavior and more severe behavior (Fedorowicz et al., 2007; Selby et al., 2010; Smith et al., 2013). However, a recent meta-analysis found that overall, eating disorders confer little risk for future suicide attempts, and no risk for suicide death (Smith, Velkoff, Ribeiro, & Franklin, 2018). Despite this finding, little research has examined this relationship in adolescents, and most adolescent studies have found eating disorder symptoms to prospectively predict suicidal behavior (Crow et al., 2008; Rodríguez-Cano et al., 2006; Wichstrøm, 2000).

Despite the strong cross-sectional link between disordered eating and suicidal behavior, few studies have looked at this link prospectively to determine if disordered eating is a true risk factor for suicide (Smith, Zuromski, & Dodd, 2018). As previously mentioned, Smith et al. (2018) found that eating disorders were weak predictors of future suicidal behavior; however, these results did not take into account the differences in findings for various eating behaviors. For instance, symptoms of bulimia nervosa and body dissatisfaction have demonstrated a more robust relationship to suicidal behavior than symptoms of anorexia nervosa (Crow, Eisenberg, Story, & Neumark-Sztainer, 2008; Crow et al., 2009; Franko et al., 2004). Furthermore, elevated rates of both disordered eating and suicidal behavior have been observed within adolescents as compared to adults, and adults constituted the majority of the samples examined by this meta-analysis due to the lack of longitudinal work existing for adolescents (Hawton & James, 2005; Smith et al., 2018). The Centers for Disease Control (2016) noted that approximately 18 percent of adolescents reported past year suicide ideation, with approximately 9 percent actually having made an attempt within the last year. As no known studies have reported rates of suicide ideation within adolescents with either subclinical disordered eating or eating disorders, several studies with adult samples have been reviewed to give a general estimate. Rates of current suicide ideation are especially elevated in adolescents that reported disordered eating – approximately 21 to 65 percent of those with eating disorders reported current ideation (Fennig & Hadas, 2010; Haley, Hedberg, & Leman, 2010), with similar studies reporting that adolescents with eating disorders or unhealthy weight control behaviors are up to 3.2 times more likely to have suicide ideation than those without these behaviors (Crow et al., 2008; Nock et al., 2013).

Many theories attempt to explain the strong link between eating disorders/disordered eating and suicidal behavior. The interpersonal-psychological theory of suicide (IPTs) provides an empirically-supported explanation (Joiner, 2005). It posits that a suicide attempt is made when an individual develops both a desire for suicide and the capability to fatally harm his/herself (Joiner, 2005). This capability is built up through repeated exposure to painful and provocative events over time, resulting in a habituation that allows the individual to overcome the evolutionarily strong fear of fatally harming themselves (Joiner, 2005; Van Orden et al., 2010). Eating disorder behaviors are inherently painful, as they are most often engaged in as extreme measures to alter body shape and abate concern about the body (e.g.,

diet restriction, vomiting, laxative and diuretic use, over-exercise, etc.). Joiner (2005) suggested that the restrictive behavior seen in anorexia would confer the highest risk for suicide among all eating disorders due to the increased engagement in painful eating disorder behaviors. However, this pattern has not been strongly supported (Witte et al., 2016), as a majority of the studies examining eating disorder behaviors as they relate to suicide have found that bingeing and purging behaviors are the most strongly correlated with suicidal behavior (Franko et al., 2004; Selby et al., 2010; Smith et al., 2013). Furthermore, Franko and colleagues (2004) found that anorexia nervosa was associated with more lifetime suicide attempts as compared to bulimia nervosa. However, only general psychopathology accounted for the greater number of attempts in anorexia nervosa, while the eating disorder behaviors themselves accounted for the attempts in bulimia nervosa (Franko et al., 2004).

While a strong correlational link between suicide and eating disorder behavior has been established, most research to date is cross-sectional, and few studies have investigated the temporal nature of this relationship to determine if eating disorder behavior is in fact a true risk factor for suicide. Within adult samples, symptoms of bulimia nervosa have been found to consistently predict subsequent suicidal behavior (Berkman, Lohr, & Bulik, 2007; Franko et al., 2004; Preti et al., 2011). However, studies of symptoms of anorexia nervosa are mixed (Franko et al., 2004; Preti et al., 2011), with some studies suggesting that general psychopathology within anorexia nervosa account for the subsequent increase in risk for suicide (Bodell, Joiner, & Keel, 2013; Bulik et al., 2008; Franko et al., 2004). However, this pattern is not observed in patients with bulimia nervosa (Bodell et al., 2013; Bulik et al., 2008). To date, no known studies have examined this relationship with suicide ideation. Furthermore, only four known studies have examined this relationship longitudinally in adolescents. One such study found that eating problems as measured by a short version of the Eating Attitudes Test (Garner et al., 1982) were prospectively predictive of suicide attempts over a span of two years, but only before accounting for previous suicide attempts (Wichstrøm, 2000). Another found similar results at a five-year follow-up (Crow et al., 2008). Two others found body dissatisfaction to be a prospective predictor of suicidal behavior at a two-year follow-up, one of suicide attempts (Rodríguez-Cano, Beato-Fernández, & Llarío, 2006) and another of suicidal ideation (Kim & Kim, 2008).

Although these studies provide a small base for understanding suicide risk within disordered eating, there are several methodological concerns that limit the utility of these findings. First, two of the three studies utilized international samples (Rodríguez-Cano et al., 2006; Wichstrøm, 2000). The use of an international sample, while informative, is not likely generalizable to a United States sample due to vast differences in several cultural, social, and interpersonal factors that may affect body ideals and eating habits. Thus, it is important to add to the existing body of literature to provide a well-rounded idea of what eating disorder factors influence suicidal behavior in all cultures. Secondly, all studies had a minimum of a two-year lag between baseline and follow-up assessments (Crow et al., 2008; Rodríguez-Cano et al., 2006; Wichstrøm, 2000). Given that disordered eating and suicide ideation fluctuate significantly from day to day (e.g., Bryan & Rudd, 2016; Klump, Keel, Culbert, & Edler, 2008; Smyth et al., 2007), shorter follow-up assessment time frames would capture more of the variation and change in these behaviors. Lastly, all three studies utilized dichotomous assessments of suicide ideation and attempts (Crow et al., 2008; Rodríguez-

Cano et al., 2006; Wichstrøm, 2000). This mode of measurement of suicidality severely limits the breadth of variance observed in suicidal thought and behavior, making it more difficult to accurately describe the associations between suicidality and closely related behaviors.

The current study seeks to fill the need for more longitudinal work on disordered eating and suicide, particularly in adolescents, to determine if disordered eating symptoms prospectively predict suicide ideation and behaviors across shorter time-frames (i.e., 6- and 12-month follow-ups). Based on previous work, we hypothesized that in an unselected community sample of high school students, a) body dissatisfaction and symptoms of bulimia nervosa would be a significant prospective predictors of suicide attempts and ideation at both follow-up time points and b) symptoms of anorexia nervosa would not be a significant prospective predictor of suicide attempts and ideation at either follow-up.

## Method

### Participants

Data were collected as part of a longitudinal study on the development of NSSI and suicidal ideation and behaviors in an unselected community sample of adolescents. Data in the current study were taken from three time points; a baseline assessment and follow-ups at 6- and 12-months. Baseline data at Time 1 were collected from 436 adolescents – 233 7<sup>th</sup> graders and 203 9<sup>th</sup> graders. The mean age at baseline was 13.19 ( $SD = 1.19$ ) with a range of 11–16, but 99.6% of participants were between the ages of 12–15. The majority of participants identified as female (52.7%) or male (46.4%) and less than 1% identified as transgendered or “other.” The majority of the sample also identified as heterosexual (88.5%), with some students identifying as gay or lesbian (0.7%), bisexual (2.1%), “not sure” (5.6%) and “decline to state” (2.4%). In terms of racial diversity, 85.3% of the participants identified as White; 2.3% as Black, 4.7% as Multiethnic, 2.8% as Hispanic, 1.9% as Asian, 0.9% as American Indian, and 2.1% as “other.” At Time 2, 373 adolescents participated, evenly split between 7<sup>th</sup> and 9<sup>th</sup> grades, for a 6-month retention rate of 85.5%. At time 3, 367 adolescents participated, again with an even split between now 8<sup>th</sup> and 10<sup>th</sup> grades, for a 12-month retention rate of 84.2%. Demographic distribution did not change across time points, with proportions of ethnicity and gender staying similar. Attrition was due to students being absent on data collection days or to students moving out of the school district.

### Procedure

Data collection occurred at two public middle and two high schools in the south-central region of the United States at baseline, and at two six-month follow-up points. (Please see Brausch & Woods, 2018, for a full description of study procedures). The research study was approved by administration at all school districts and the Institutional Review Board at Western Kentucky University. Active parental consent was required and parent consent forms were sent home with all 7<sup>th</sup> grade students at two middle schools (~700 students), and all 9<sup>th</sup> grade students at two high schools (~476 students). The response rate for 7<sup>th</sup> graders was 42.7% (n=299; 257 positive consent, 42 negative) and for 9<sup>th</sup> graders was 47.5%

(n=226; 221 positive consent, 5 negative). Adolescent participants with positive parent consent were also given a written assent form to complete before beginning the study. Out of 478 total positive parent consent forms returned, 91.2% of adolescents participated in the study (n=436). Data collection occurred during school hours at each school, and all participants at each school completed the research study in one large group (e.g., spread out in the school cafeteria) or in individual classrooms. The Ph.D.-level researcher was present at all data collection sessions, in addition to up to four master's level graduate students and up to six undergraduate research assistants. Students were informed that they may be referred to speak to a school counselor if the research team assessed their responses to indicate suicide risk.

After completing the research protocols, measures were thoroughly checked for pre-determined critical items that indicate depression or suicide risk. If a student was determined to be at risk on any of the identified measures, he or she was called out of a different class period later in the day to follow-up with a school counselor. An Intervention Record was completed by the research team for each identified student to classify them at one of three levels of severity (Low, Moderate, or High) with a recommendation for follow-up (ranging from monitor/review to immediate interview/follow-up). The completed records were left with the school counselors at each school to facilitate follow-up with the identified students. At Time 1, 6.4% of participants (n=28; 13 high school, 15 middle school) were referred. At Time 2, 5.6% were referred (n=21; 14 high school, 7 middle school) and at Time 3, 5.2% were referred (n=19; 10 high school, 9 middle school). At all schools, counselors assisted with parent consent distribution and collection, scheduling and organizing data collection sessions, and agreed to provide follow-up services to students identified as being at risk for suicide behaviors. School counselors followed established policies and procedures at their school for working with students at risk based on their determination of level of intervention needed.

## Measures

**Eating Disorder Inventory – Third Edition—(EDI-3; Garner, 2004).** The EDI-3 is a 91-item self-report measure that assesses symptoms indicative of eating disorder risk and psychological domains that are conceptually relevant to eating disorders. The EDI was designed for use with individuals ages 13 and older, and can be used with clinical and nonclinical samples. The current study utilized three subscales from the EDI-3 that make up the Eating Disorder Composite – Drive for Thinness (7 items), which assesses symptoms of anorexia nervosa, Bulimia (8 items), which assesses symptoms of bulimia nervosa, and Body Dissatisfaction (10 items). These subscales assess preoccupation with being thin and fear of gaining weight, symptoms of bulimia, and satisfaction with various parts of the body. EDI items are presented in a 6-point Likert format ranging from 6 (always) to 0 (never). Items are scored so that responses in the pathological direction for each item are weighted. Subscale scores are calculated by summing the weighted responses with higher scores indicating greater dysregulation and deficits. Internal consistency has been found to be high ( $\alpha = .90$  to  $.97$ ) for diagnostic and normative groups and test retest reliability is excellent ( $\alpha = .93$  to  $.95$ ). In the current sample, internal consistencies ranged from adequate to good for

all subscales at Time 1 (Drive for Thinness  $\alpha=.80$ , Bulimia  $\alpha=.74$ , Body Dissatisfaction  $\alpha=.88$ ).

**Suicidal Ideation Questionnaire – Junior**—(SIQ-JR; Reynolds, 1987). The SIQ-JR is a 15-item self-report measure of an adolescent's suicidal ideation in the past month, designed for use with adolescents in grades 7–12. Items are rated according to a 7-point scale ranging from 6 (almost every day) to 0 (I never had this thought). Total scores range from 0 to 90 with higher scores indicating a greater intensity of suicidal ideation. The SIQ-JR has a clinical cut-off score of 31 and in the current sample, 3% of adolescents scored above this cut-off at baseline. The SIQ-JR has demonstrated good internal consistency ( $\alpha = .94$  to  $.97$ ), and adequate concurrent and construct validity (Pinto, Whisman, & McCoy, 1997). The SIQ-JR showed excellent internal consistency at all time points in the current sample ( $\alpha$ 's = 0.93 to 0.95).

## Results

### Data management and analytic plan

Given the in-person nature of data collection and thoroughness of prompting participants to complete all measures, there was minimal missing data. Incomplete data were removed before running analyses, and no more than 10 individuals were removed for each separate analysis. After examining the base rates for suicide attempts at Times 2 and 3, it was determined that these analyses would be underpowered and were not run. Only 2 adolescents at Time 2 and 3 adolescents at Time 3 reported suicide attempts during the 6-month follow-up periods. T-tests were run on all variables by gender, and females reported significantly higher scores than males on eating disorder subscales and suicide ideation at all time points (see Table 1). Given that suicide ideation variables are typically skewed, the distributions of SIQ total scores at all points were examined. All were found to have higher than desirable values on skewness and kurtosis (SIQ1: skew=3.78, kurtosis=17.91; SIQ2: skew= 3.83, kurtosis=17.29; SIQ3: skew=4.36, kurtosis=25.40). Square root transformations were used on all SIQ variables which resulted in improved distributions (SIQ1: skew = 1.53, kurtosis=2.42; SIQ2: 1.63, kurtosis=2.77; SIQ3: skew=1.69, kurtosis=3.07). Transformed SIQ variables were used in all analyses.

Hypotheses about eating disorder subscales predicting suicide ideation were tested using hierarchical linear regression analyses. Baseline suicide ideation severity was entered into the first step of the model, followed by the eating disorder subscale scores. The total scores from the SIQ at Time 2 or Time 3 were entered as the outcome variable. The hypotheses were first tested with the whole sample, and were then tested separately by gender given the significant differences on all variables.

### Hypothesis Testing

In the whole sample, hierarchical linear regression analyses found only body dissatisfaction ( $\beta = .220$ ,  $p = .001$ ) to prospectively predict severity of suicide ideation at 6-month follow-up after controlling for suicide ideation severity at baseline. The eating disorder subscales accounted for an additional 3.7% of the overall variance, increasing total variance explained



to 38.2% (see Table 2). Additionally, hierarchical linear regression analyses found both symptoms of bulimia nervosa ( $\beta = .121, p < .05$ ) and body dissatisfaction ( $\beta = .150, p < .05$ ) at baseline to prospectively predict suicide ideation one year later after controlling for suicide ideation severity at baseline. The eating disorder subscales accounted for an additional 3.4% of the overall variance, increasing total variance explained to 34.7%. Drive for thinness was not a significant predictor in either analysis (see Table 2).

When running the models separately by binary gender groups, results were different. In the sample of girls ( $n = 229$ ), body dissatisfaction ( $\beta = .252, p < .01$ ) was a significant predictor of suicide ideation severity at 6-month follow-up. In this model, the eating disorder subscales accounted for an additional 3.8% of the variance, bringing the total variance explained to 39%. When predicting suicide ideation severity at 12-month follow-up, both body dissatisfaction ( $\beta = .254, p < .01$ ) and the bulimia subscale ( $\beta = .205, p < .01$ ) were significant predictors. The eating disorder subscales accounted for an additional 7.6% of the variance, bringing the total variance explained to 36.8%. For the sample of boys ( $n = 201$ ), the eating disorder subscales did not add significant variance to the model, and none were significant predictors of suicide ideation severity at 6-month or 12-month follow-up (see Table 3).

## Discussion

This study is the first in over a decade to investigate the temporal relationship between eating disorder symptoms and suicidal ideation in adolescents. As the age of onset for eating disorders typically falls in early to mid-adolescence (Killen et al., 1994; Martínez-González et al., 2003), it is especially important to study this relationship within this age group to gain a strong developmental perspective on these behaviors. Overall, our results showed that there is a prospective relationship between some eating disorder symptoms and suicide ideation at both 6- and 12-months follow-up in females only. This pattern was not observed in the male only sample.

The first hypothesis, that body dissatisfaction would prospectively predict suicide ideation was supported in that body dissatisfaction was a significant predictor of suicide ideation at the 6- and 12-month follow-ups. The second hypothesis, that symptoms of bulimia nervosa would prospectively predict suicide ideation, was partially supported, in that symptoms of bulimia was a significant predictor at only the 6-month follow-up assessment. The third hypothesis, that symptoms of anorexia nervosa would not prospectively predict suicide ideation, was fully supported, in that the drive for thinness subscale was not a significant predictor at either 6 or 12 months post-baseline. Due to the low rate of suicide attempts in our sample across the 12 months, we were unable to test the prospective relationship between eating disorder symptoms and suicide behaviors. Future studies could examine this relationship within a larger sample of adolescents, possibly across multiple time points that span a longer time frame than the current study. Conversely, examining the relationships between eating disorder symptoms and suicide ideation and behavior across shorter time periods, such as at 1- or 3-month follow-ups, could provide a more precise picture of how these behaviors develop in real time.

Of the current study's results, the one most in line with prior research was the predictive relationship between symptoms of bulimia nervosa and suicidal ideation. Cross-sectional studies have consistently supported the association between symptoms of bulimia nervosa and suicidal ideation and behaviors, even after accounting for other psychopathology (Franko et al., 2004; Milos; Spindler, Hepp, & Schnyder, 2004). The current study also did not find symptoms of anorexia nervosa to be predictive of future suicidal ideation, further supporting the growing literature in this area. Historically, anorexia nervosa was hypothesized to be more strongly related to suicidal ideation and behavior due to the greater number of suicide attempts seen in this disorder as compared to other eating disorders (Arcelus et al., 2011; Selby et al., 2010). However, more recent work has suggested that these increased rates of suicidal ideation and behavior may be more strongly associated with comorbid psychopathology seen in eating disordered patients (Franko, 2004). Additionally, this study is one of the first to establish the temporal relationship between body dissatisfaction and suicide ideation, and fully supports the findings of the only other known previous studies (Kim & Kim, 2008; Rodríguez-Cano et al., 2006). Kim and Kim (2008) found body dissatisfaction to prospectively predict suicide ideation, and Rodríguez-Cano and colleagues (2006) found the same pattern with suicide attempts. In their study, ideation was dichotomized, and attempts were measured by the number of occurrences since the last assessment. However, Kim and Kim used only 3 items to assess body dissatisfaction. The current study's results are novel, in that a continuous measure of ideation was used, and that a validated measure was used to assess body dissatisfaction. Future work may benefit from looking at this relationship over even shorter periods of time.

The predictive relationship between disordered eating behaviors and suicide ideation may also map onto the desire for suicide as laid out by the IPTS. Previous work has supported the use of the IPTS as a useful framework in which to investigate suicidal behavior within eating disorder populations (Pisetsky, Crow, & Peterson, 2017; Smith et al., 2017). According to this theory, the desire for suicide, which is analogous to suicide ideation, comes from a combination of feelings of perceived burdensomeness to others and a sense of social isolation or thwarted belongingness. Therefore, it follows that if in our study, symptoms of bulimia nervosa and body dissatisfaction predicted suicide ideation, they may be related to the aforementioned constructs. To our knowledge, only one study has investigated the relationship between body dissatisfaction and suicidal behavior through perceived burdensomeness or thwarted belongingness, and the results indicated that body dissatisfaction was related to suicide ideation through perceived burdensomeness, but not thwarted belongingness (Forrest et al., 2016). Additional research has found that general eating psychopathology is related to suicide risk through both perceived burdensomeness and thwarted belongingness (Dodd et al., 2014; Kwan et al., 2017). Future research should investigate these pathways with individual disordered eating behaviors.

Another goal of the study was to examine the prospective relationship between eating disorder symptoms, particularly symptoms of bulimia nervosa, and suicide attempts. However, due to the low base rate of suicide attempts at both the 6- (n=2) and 12-month (n=3) follow-ups, we were unable to test this hypothesis. Past research has found symptoms of bulimia nervosa to be stronger prospective predictors of suicide attempts than other eating disorder symptoms, such as body dissatisfaction and symptoms of anorexia nervosa. It is



likely that behaviors such as bingeing and purging represent a more active form of disordered eating behavior, as a specific amount of effort must be exerted to engage in these probably inherently painful behaviors, as compared to the extreme dietary restriction and fasting that is common to anorexia nervosa. Although habitual starvation and extreme dieting seen in anorexia nervosa may be exceptionally painful, these behaviors are defined by their goal of avoidance and resisting the urge to engage in other forms of weight and shape control. By contrast, those who actively engage in weight and shape control behaviors like bingeing and purging, may produce a heightened ability to engage in painful behaviors. According to the IPTS, this process may increase one's acquired capability, or the ability to make a lethal suicide attempt (Joiner, 2005). Future research should continue to investigate this link as symptoms of bulimia nervosa appear to confer a unique risk for suicidal behavior (Anestis et al., 2012; Franko et al., 2004; Milos; Spindler, Hepp, & Schnyder, 2004).

Based on our findings, body dissatisfaction appears to contribute to thoughts of suicide consistently over time. Previous longitudinal research in adolescents has found body dissatisfaction to prospectively predict suicide ideation at a 2- and 5-year follow-up, respectively (Kim & Kim, 2008; Rodríguez-Cano et al., 2006). Although the mechanisms of this relationship have not yet been examined, a possible explanation may be that body dissatisfaction confers risk for suicidal ideation through the thwarted belongingness and/or perceived burdensomeness components of the IPTS (Joiner, 2005). Body dissatisfaction has been found to associate with social anxiety, isolation, and withdrawal (Davison & McCabe, 2005; Hayden-Wade et al., 2005; Schutz & Paxton, 2007; Striegel-Moore, Silberstein, & Rodin, 1993), which are all constructs that are linked to the aforementioned components of the IPTS across a multitude of social situations (Baams, Grossman, & Russell, 2015; O'Reilly & Robinson, 2009; You et al., 2011; Van Orden et al., 2012). Clearly, body dissatisfaction plays an important role in the development of suicidal ideation, and this construct should be studied further, especially in disordered eating samples.

Additionally, exploratory analyses found that overall, eating disorder symptoms were much better predictors of suicide ideation in girls as compared to boys. In the sample of girls, only body dissatisfaction at baseline was predictive of suicide ideation at the 6-month follow-up, and both body dissatisfaction and symptoms of bulimia nervosa at baseline were predictive of suicide ideation at the 12-month follow-up. In the sample of boys, none of the eating disorder subscales were predictive of suicide ideation at either follow-up. These findings closely mirror previous research, as many studies have demonstrated the utility of eating disorder symptoms as predictors of suicidal behavior in females, but not in males (Crow et al., 2008; Kim & Kim, 2008; Wichstrøm, 2000). Rodríguez-Cano and colleagues (2006) found further support for gender differences in that body dissatisfaction in particular varied significantly by gender, such that females tended to be more dissatisfied with their bodies than males, resulting in body dissatisfaction being a greater predictor of future suicidal behavior in the female-only model. According to epidemiological studies, eating disorders are much more prevalent in females than males (Hudson et al., 2007; Smink et al., 2012; Swanson et al., 2011), which may help to explain the differences in findings. While body dissatisfaction has found to be a salient issue in both males and females, the issues that they report are different. Males tend to report more issues with muscularity (Griffiths, Murray, & Touyz, 2015), while females report a greater drive for thinness and body shape concerns

(Benton & Karazsia, 2015). Perhaps these different ideals drive different behaviors, with those that promote excessive thinness conferring a greater risk for suicide.

The current study acknowledges several limitations. First, the relatively low base rate for suicide attempts, while reassuring in a community adolescent sample, significantly limited the ability to directly investigate the relationship between suicide attempts and eating disorder behavior. However, as suicide ideation has been shown to be among the strongest risk factors for suicide attempts (Glenn & Nock, 2014; Nock, Green, & Hwang, 2013), we believe our findings regarding eating disorder symptoms and suicide ideation are valuable. Furthermore, the use of a continuous measure of suicide ideation as compared to dichotomous assessments used in previous studies provides a greater understanding of the strength of this relationship as we were able to measure severity of suicide ideation. Second, the use of a community sample yielded lower base rates of eating disorder behavior than would have been observed in a clinical sample. However, this sample did yield similar base rates of eating disorder behavior as generally reported in adolescents (Patton, Selzer, Coffey, Carlin, & Wolfe, 1999; Smink, van Hoeken, & Hoek, 2012; Swanson, Crow, le Grange, Sewndson, & Merikangus, 2011), and provided far greater ecological validity. Lastly, our homogenous sample limits the generalizability of our findings to some minority groups; however, the population was representative of rural American youth, who have reported greater suicide risk than the general population (Fontanella et al., 2015).

Despite the current study's limitations, this study makes a significant contribution to the expanding body of research on suicidality in adolescents, particularly those who struggle with disordered eating. To the authors' knowledge, this is the first longitudinal study of disordered eating and suicide ideation in American adolescents. It is important to note that only symptoms of bulimia nervosa and body dissatisfaction were true risk factors for suicidal ideation. Anorexia symptoms, while undoubtedly related to suicidal ideation, may not be a risk factor for suicidality as much as a correlate for these behaviors. Overall, the current study demonstrates the importance of disordered eating behaviors in the development of suicidal ideation in adolescents.

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**Table 1.**Means, standard deviations, and *t*-test results for gender differences on all study variables

Variable (Mean, SD)	Females	Males	Total	<i>t</i>
Suicide Ideation Baseline	1.60 (1.90)	1.01 (1.31)	1.34 (1.68)	-3.66**
Suicide Ideation 6-months	1.64 (1.88)	0.99 (1.43)	1.32 (1.74)	-3.69**
Suicide Ideation 12-months	1.47 (1.87)	0.84 (1.27)	1.19 (1.66)	-3.62**
Drive for Thinness	1.03 (.97)	0.63 (.62)	0.84 (.84)	-5.01**
Bulimia	0.43 (.63)	0.26 (.39)	0.35 (.54)	-3.29**
Body Dissatisfaction	1.92 (1.06)	1.35 (.82)	1.66 (.99)	-6.12**

\*\*  
 $p < .01$

Note. Suicide ideation scores are transformed total scores from the SIQ-JR. Drive for thinness, bulimia, and body dissatisfaction scores are from the EDI-3.

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**Table 2.**

Regression results for eating disorder subscales at baseline predicting suicide ideation severity at 6- and 12-month follow-ups for whole sample

Model	$\beta$	$t$	$F$	$R^2$
<b>Model 1 – 6-month follow-up</b>				
1. Suicide Ideation Baseline	0.594	13.55**	183.55**	0.353
2. Drive for Thinness	-0.068	-1.063	6.67**	0.037
Bulimia	0.066	1.268		
Body Dissatisfaction	0.220	3.29**		
<b>Model 2 – 12-month follow-up</b>			154.31**	0.321
1. Suicide Ideation Baseline	0.567	12.42**	5.62**	0.034
2. Drive for Thinness	-.028	-.427		
Bulimia	0.121	2.24*		
Body Dissatisfaction	0.150	2.14*		

\*  
 $p < .05$

\*\*  
 $p < .01$

**Table 3.**

Regression results for eating disorder subscales predicting suicide ideation severity at 6- and 12-month follow-ups by gender

<b>Model (Girls only)</b>	<b><math>\beta</math></b>	<b><math>t</math></b>	<b><math>F</math></b>	<b><math>R^2</math></b>
Model 1 – 6-month follow-up				
1. Suicide Ideation Baseline	0.604	10.06**	101.15**	0.365
2. Drive for Thinness	–0.162	–1.67	3.72*	0.038
Bulimia	0.117	1.62		
Body Dissatisfaction	0.252	2.60**		
Model 2 – 12-month follow-up			76.73**	0.306
1. Suicide Ideation Baseline	0.553	8.76**	7.01**	0.076
2. Drive for Thinness	–.092	–.952		
Bulimia	0.205	2.80**		
Body Dissatisfaction	0.254	2.60**		
<b>Model (Boys Only)</b>	<b><math>\beta</math></b>	<b><math>t</math></b>	<b><math>F</math></b>	<b><math>R^2</math></b>
1. Suicide Ideation Baseline	.527	7.79**	60.66**	.277
2. Drive for Thinness	.035	.431	2.55	.034
Bulimia	–.003	–.037		
Body Dissatisfaction	.169	1.80		
Model 2 – 12-month follow-up			52.53**	.263
1. Suicide Ideation Baseline	.513	7.25**	.045	.001
2. Drive for Thinness	–.014	–.153		
Bulimia	–.030	–.345		
Body Dissatisfaction	.020	.194		

\*  $p < .05$

\*\*  $p < .01$