

Anxiety, Appearance Contingent Self-Worth, and Appearance Conversations with Friends in Relation to Disordered Eating: Examining Moderator Models

Anna M. Bardone-Cone · Lisa M. Brownstone ·
Mary K. Higgins · Ellen E. Fitzsimmons-Craft ·
Megan B. Harney

Published online: 11 January 2013
© Springer Science+Business Media New York 2013

Abstract This study examined whether anxiety, combined with a focus on appearance, would identify individuals most likely to exhibit eating pathology, conceptualized as safety behaviors/avoidance strategies. In particular, we examined appearance contingent self-worth and appearance conversations with friends as possible moderators of the anxiety-disordered eating relation. Participants were 441 women attending a Southeastern university who completed an online survey. Results indicated that those with the three-way combination of high anxiety, high appearance contingent self-worth, and frequent appearance conversations exhibited the most frequent binge eating. While no significant three-way interactions emerged for broad eating pathology and dietary restraint, in both models it was the anxiety \times appearance contingent self-worth interaction that accounted for unique variance in these eating patterns. Results provide researchers and clinicians with a better understanding of who experiences various types of disordered eating in association with anxiety and possible points of intervention.

Keywords Anxiety · Appearance contingent self-worth · Appearance conversations with friends · Disordered eating · College women

Introduction

Anxiety has strong connections with eating disorders and disordered eating, including dietary restriction and binge

eating (Arnow et al. 1992; Fitzsimmons and Bardone-Cone 2011; Pallister and Waller 2008; Swinbourne and Touyz 2007). For example, anxiety disorders are more prevalent in individuals with eating disorders than in community samples (Swinbourne and Touyz 2007). Some anxiety disorders, namely generalized anxiety disorder and social phobia, are associated with all forms of eating pathology, while another disorder, obsessive compulsive disorder, is associated with mostly dietary restriction (Pallister and Waller 2008). Symptoms of anxiety appear to precede the development of disordered eating with, for example, many anxiety disorders predating eating disorder onset (Kaye et al. 2004). Work examining where eating pathology fits in a diagnostic taxonomy suggests that eating pathology is on an internalizing spectrum along with anxiety disorders (Forbush et al. 2010), further supporting the connection between anxiety and disordered eating.

The cognitive model of anxiety posits that anxiety emerges from interpreting excessive threat to innocuous situations, combined with underestimating one's personal coping abilities (Beck et al. 1985). The desire to avoid or reduce feelings of anxiety motivates the use of safety behaviors and avoidance strategies, behaviors/strategies that may decrease anxiety in the short-term, but also may help maintain the anxiety since individuals are not able to learn that the threat is non-existent or manageable (Helbig-Lang and Petermann 2010; Salkovskis 1991). Pallister and Waller (2008) argue that various disordered eating behaviors can function as safety behaviors and avoidance strategies. For example, dietary restriction can foster a sense of control and a sense of safety, in particular from a fear of weight gain, while binge eating can provide an escape/avoidance of aversive self-awareness and negative affect by temporarily “anaesthetizing” negative emotional states (Heatherton and Baumeister 1991). Thus, the relation

A. M. Bardone-Cone (✉) · L. M. Brownstone ·
M. K. Higgins · E. E. Fitzsimmons-Craft · M. B. Harney
Department of Psychology, University of North Carolina
at Chapel Hill, CB #3270, Chapel Hill, NC 27599, USA
e-mail: bardonec@email.unc.edu; bardonecone@unc.edu

between anxiety and disordered eating may be understood in part through the affect regulation function of dietary restriction and binge eating (Cain et al. 2010; Heatherton and Baumeister 1991). Since compulsive behaviors can reduce anxiety at least in the short-term (with obsessive compulsive disorder as a prime example; Swinbourne and Touyz 2007), aspects of disordered eating with compulsive qualities may also function to decrease anxiety.

Not all individuals, however, respond to anxious feelings by engaging in disordered eating behaviors, which highlights the need to identify moderators of the anxiety-disordered eating relationship. We theorize that anxiety combined with a focus on appearance may identify individuals most likely to exhibit eating pathology. In this study, we examine appearance contingent self-worth and appearance conversations with friends as potential moderators of the anxiety/disordered eating relation in a sample of female undergraduates, a group that is generally at elevated risk for disordered eating (Hoerr et al. 2002; Krahn et al. 2005).

Appearance contingent self-worth, reflecting deriving one's sense of self and worth from how one looks, is one of the domains of contingent self-worth identified by Crocker and Wolfe (2001) and is relevant to college students and women in particular (Crocker et al. 2003). There is evidence that basing one's self-esteem on weight/shape discriminates between individuals with eating disorders and controls (Geller et al. 1998), which suggests an association between appearance contingent self-worth and eating pathology. Among anxious individuals, a heightened value of appearance may guide their choices of safety behaviors in response to anxiety, thus positioning appearance contingent self-worth as a moderator. If appearance is important to the self-worth of a highly anxious woman, a behavior such as dieting could be seen as an efficient way to both provide a sense of safety and control (addressing the anxiety) and to potentially lose weight, which would be in line with appearance contingent self-worth in Western cultures.

The tendency to converse with others about one's appearance may also serve as a moderator of the relation between anxiety and disordered eating. Appearance conversations call attention to one's body and help reinforce the importance of appearance, all of which could foster body dissatisfaction and motivate disordered eating (Jones et al. 2004). To our knowledge, the degree to which frequent conversations about appearance is related to eating pathology has not been studied; however, research supports links between appearance-based conversations and body dissatisfaction, which is a robust predictor of eating pathology (Stice 2002). In samples of adolescent females, frequency of appearance conversations accounted for unique variance in body dissatisfaction (Lawler and Nixon 2011) and

prospectively predicted changes in body dissatisfaction (Jones 2004). Given that appearance conversations can call attention to and facilitate rumination over body flaws and given evidence that individuals with anxiety exhibit an attentional bias towards emotionally negative stimuli and threatening information (Mathews and Macleod 1994), is it likely that, in the context of appearance-based conversations with friends, anxious individuals will attend to negative comments in particular (e.g., to a discussion of dissatisfaction with one's weight). For someone already high in anxiety, appearance conversations may amplify anxiety and motivate disordered eating – dietary restriction as a safety behavior (that might also be perceived as moving one toward appearance goals discussed with friends) or binge eating as an avoidance behavior.

Pallister and Waller (2008) propose that anxious cognitions may manifest as an anxiety disorder given one environmental context, and as disordered eating given another context. For example, an anxious person who frequently engages in conversations about appearance is more likely to attempt weight control than an individual who does not experience this environmental trigger. Individual difference variables may also direct anxious cognitions to eating pathology. For example, an anxious person who relies on her appearance for a sense of self-worth will more likely restrict as a means of obtaining a sense of control (and thus reducing anxiety) and bolstering her sense of attractiveness and thus self-worth, compared to an anxious person without appearance contingent self-worth.

Framing the disordered eating behavior of dietary restriction as a safety behavior and binge eating as an avoidance strategy, the question becomes: among those experiencing anxiety, who is likely to seek out these behaviors and strategies to serve these affect regulation functions? We suggest that appearance contingent self-worth and appearance conversations with friends may set the stage for anxious individuals turning to restriction and binge eating as safety behaviors and avoidance strategies, respectively. In particular, we tested a three-way interactive model, hypothesizing that among individuals high in anxiety, those who are highly reliant on their appearance for their sense of self-worth and who engage in frequent conversations with friends about appearance, would exhibit the highest levels of disordered eating. We examined this model for three aspects of disordered eating: broad disordered eating attitudes and behaviors, dietary restraint, and binge eating. In models where no significant three-way interaction emerged, we interpreted the two-way interactions involving anxiety (i.e., anxiety x appearance contingent self-worth and anxiety x appearance conversations) in the context of the full model to investigate the relative importance of these interactions.

Methods

Participants

Participants were undergraduate females ($N = 441$) at a large, public Southeastern university; they were recruited through introductory psychology classes with the only selection criterion of being female. Participants ranged in age from 17 to 24 with a mean age of 18.71 years ($SD = 1.01$ years). The majority (73.2 %) self-reported as Caucasian/White, 9.1 % as African American/Black, 8.0 % as Hispanic/Latina, 5.0 % as Asian, 0.4 % as other races/ethnicities, and 4.3 % as multiple race/ethnicities. Highest parental education attained was used as a proxy for socioeconomic status with a mean of 17.01 years ($SD = 2.67$), reflecting a little over 4 years of post-secondary education. Based on their self-report of current height and weight, average body mass index (BMI) was 22.39 kg/m^2 ($SD = 3.73$; range 16.76–41.24).

Procedures

Participants completed an online survey in a private setting (e.g., their home) as part of a study presented as a study of peers and body image. A link to the survey and consent form was emailed to the participants, followed up by a call from a research assistant to highlight aspects of the consent form and answer any questions about the study. After participants provided electronic consent, they were directed to the questionnaires, which were presented in a fixed order and took 45–60 min to complete; they received course credit for completing the survey. This study was reviewed and approved by the university's Institutional Review Board.

Measures

Spielberger State-Trait Anxiety Inventory, Trait Anxiety Scale (STAI; Spielberger et al. 1970)

The STAI Trait Anxiety scale is 20-item measure assessing an individual's tendency to be anxious; it captures trait anxiety, or "relatively stable individual differences in anxiety proneness" (Spielberger et al. 1970, p. 3). Participants respond to items using a 4-point scale from 1 = *almost never* to 4 = *almost always*, and a summed score is computed with higher values reflecting greater anxiety. Construct validity is evidenced by responses to the state anxiety scale, but not responses to the trait anxiety scale, varying in the face of different stressors (Hedberg 1972). Additionally, the trait anxiety scale correlates highly with measures of negative affectivity (Watson and Clark 1984) and differentiates between individuals with and

without anxiety disorders (Taylor et al. 1992). The trait anxiety scale has demonstrated good internal consistency (.92—Ramanaiah et al. 1983) as well as good test-retest reliability (.97—Metzger 1976) in samples of college students. In the current study, alpha was .94.

Eating Attitudes Test-26 (EAT-26; Garner et al. 1982)

The EAT-26 is a 26-item measures that assesses a broad range of disordered eating attitudes and behaviors. Items are rated from 1 = *never* to 6 = *always*, with higher scores reflecting greater eating pathology. As recommended by Garner et al. (1982), responses of 1, 2, or 3 are scored as "0," while responses of 4, 5, or 6 are scored as "1," "2," or "3," respectively, with items then summed so that higher scores reflect greater eating pathology. The EAT-26 is one of the most widely used standardized measures of eating disorder attitudes/behaviors and is effective as a screening measure, with a cutoff score of 20 indicating a probable eating disorder (King 1989, 1991). Internal consistency ($\alpha = .94$) and test-retest reliability ($r = .84$) have been demonstrated in a female undergraduate sample (Carter and Moss, 1984). In the present study, coefficient alpha was .90.

Eating Disorder Examination-Questionnaire, Restraint Subscale (EDE-Q; Fairburn and Beglin 2008)

The Restraint subscale is a 5-item subscale of the EDE-Q that assesses attempts to restrict dietary intake (e.g., trying to limit amount of food or exclude certain foods from one's diet). Participants rate the presence of such attempts over the past 28 days using a 6-point scale from 0 = *no days* to 6 = *every day*, with a rating of 3 representing the midpoint and 13–15 days. Items are averaged to compute an overall restraint score, with higher scores reflecting greater restraint. The EDE-Q is one of the most commonly used measures of disordered eating attitudes and behaviors in community and clinical populations (Anderson and Williamson 2002), and the Restraint subscale has demonstrated good internal consistency in an undergraduate female sample (.85—Luce and Crowther 1999). In the current study, coefficient alpha was .81.

Eating Disorder Examination-Questionnaire, Binge Eating Frequency (EDE-Q; Fairburn and Beglin 2008)

The EDE-Q was also used to assess binge eating frequency. Participants reported on the number of days of the past 28 days when they ate an unusually large amount of food and had a sense of loss of control during that eating episode. These criteria of a large amount of food and loss of control are considered the key elements of binge eating (APA 2000).

Contingencies of Self-Worth Scale, Appearance Subscale (CSW; Crocker et al. 2003)

The Appearance subscale of the CWS (Crocker et al. 2003) is a 5-item subscale with items rated from 1 = *strongly disagree* to 7 = *strongly agree*, with item responses averaged so that higher scores reflect greater dependence of self-worth on appearance. A sample item is “My sense of self-worth suffers whenever I think I don’t look good.” The appearance contingent self-worth subscale has demonstrated adequate internal consistency ($\alpha = .83$) and three-month test-retest reliability ($r = .75$) in undergraduate samples, as well as convergent validity via significant positive correlations with narcissism, shopping, grooming, and increases in exercising (Crocker et al. 2003). In the current sample, coefficient alpha was .76.

Appearance Culture Among Peers Scale, Appearance Conversations with Friends Subscale (Jones et al. 2004)

The Appearance Conversations with Friends subscale contains five items rated from 1 = *never* to 5 = *very often*, with item responses averaged so that higher scores reflect greater frequency of talking with friends about “expectations for their bodies and for appearance enhancements” (Jones et al. 2004; p. 329). Sample items include “My friends and I talk about the size and shape of our bodies” and “My friends and I talk about what we would like our bodies to look like.” The Appearance Conversations with Friends subscale has shown adequate reliability among a sample of adolescent girls ($\alpha = .85$), as well as

construct validity based on significant positive correlations between scores on this subscale and internalization of media ideals and body dissatisfaction (Jones et al. 2004). Of note, the significant relations between appearance conversations, as assessed by this measure, and body dissatisfaction exist even though the valence of the appearance conversations is not assessed (Jones 2004; Jones et al. 2004; Lawler and Nixon 2011); in fact, for some items valence is not appropriate (e.g., “My friends and I talk about how important it is to always look attractive”). Thus, this measure of appearance conversations focuses on the act of talking about appearance and does not specify whether positive, negative, or neutral comments are made about appearance. In the current study, coefficient alpha was .91.

Analytic Strategy

To test the interactive models, we conducted hierarchical multiple regression analyses following the guidelines prescribed by Cohen et al. (2003) and Frazier et al. (2004), and controlled for BMI given its positive relations with anxiety and disordered eating (see Table 1). For each three-way interaction, BMI was entered as a covariate in Step 1, anxiety and the moderators were entered as a set in Step 2, all two-way interactions between the independent variables (anxiety, appearance contingent self-worth, appearance conversations) were entered as a set in Step 3, and the three-way interaction of anxiety \times appearance contingent self-worth \times appearance conversations was entered in Step 4. This approach was used for each of the three dependent

Table 1 Means, standard deviations, and correlations for the study variables

	1	2	3	4	5	6	7
1. Anxiety	$M = 41.74$ $SD = 11.05$						
2. Appearance contingent self-worth	.52***	$M = 5.12$ $SD = .94$					
3. Appearance conversations	.16**	.29***	$M = 2.86$ $SD = .96$				
4. EAT-26	.47***	.47***	.39***	$M = 8.27$ $SD = 9.44$			
5. Restraint	.53***	.43***	.31***	.76***	$M = .89$ $SD = 1.14$		
6. Binge eating	.30***	.25**	.17***	.37***	.48***	$M = 1.80$ $SD = 3.68$	
7. BMI	.11*	.07	.08	.11*	.19***	.14***	$M = 22.39$ $SD = 3.73$

EAT-26 Eating Attitudes Test-26, BMI body mass index. Restraint represents dietary restraint and comes from the EDE-Q = Eating Disorder Examination-Questionnaire (EDE-Q). Binge eating refers to the number of days of binge eating over the past 28 days and also comes from the EDE-Q. Possible ranges for the study variables are as follows: anxiety (20–80), appearance contingent self-worth (1–7), appearance conversations (1–5), EAT-26 (0–78), and binge eating (0–28). * $p < .05$, ** $p < .01$, *** $p < .001$

variables: EAT-26 scores, dietary restraint, and binge eating frequency. If a three-way interaction was not significant, the two-way interactions of anxiety \times appearance contingent self-worth and anxiety \times appearance conversations were examined in the context of the full model (i.e., controlling for all two-way interactions and the three-way interaction). Significant interactive findings were probed with simple slope analyses (Aiken and West 1991).

Results

Descriptive Analyses

Means and standard deviations for the study variables and their correlations are presented in Table 1. Anxiety and the proposed moderators (appearance contingent self-worth, appearance conversations with friends) were positively related to disordered eating, assessed as broad eating pathology, dietary restraint, or binge eating. Anxiety was also positively correlated with appearance contingent self-worth and appearance conversations, with the correlation stronger for anxiety/appearance contingent self-worth

($r = .52$) than for anxiety/appearance conversations ($r = .16$). The disordered eating constructs were positively associated with each other (r s from $.37$ to $.76$, p s $< .001$), which is not surprising given prior work examining the co-occurrence of dietary restraint and binge eating (e.g., Neumark-Sztainer et al. 2007; Spencer and Fremouw 1979). BMI was modestly positively correlated with anxiety and disordered eating, but not with the moderators.

Interactions of Anxiety, Appearance Contingent Self-Worth, and Appearance Conversations with Friends

The three-way interaction of anxiety \times appearance contingent self-worth \times appearance conversations with friends was not significant in identifying EAT-26 scores ($\beta = -.02$, $t(362) = -.36$, $\Delta R^2 = .000$, $p = .720$). When examining the two-way interactions involving anxiety in the context of the full model, the interaction of anxiety and appearance contingent self-worth accounted for unique variance in eating pathology, but the interaction of anxiety and appearance conversations did not (see Table 2). The nature of the interaction was such that women high on anxiety who had high levels of appearance-contingent

Table 2 Hierarchical multiple regression analyses testing the interactive model involving anxiety, appearance contingent self-worth, and appearance conversations with friends with the dependent variable of EAT-26 scores, controlling for body mass index

Step and predictors	B	SE B	β	t	R^2
Step 1					.01
BMI	.29	.13	.12	2.24*	
Step 2					.36
BMI	.10	.11	.04	.94	
Anxiety	.26	.04	.31	6.25***	
Appearance contingent self-worth	2.21	.49	.23	4.54***	
Appearance conversations	2.65	.43	.27	6.18***	
Step 3					.42
BMI	.09	.10	.04	.95	
Anxiety	.22	.04	.26	5.36***	
Appearance contingent self-worth	2.59	.47	.27	5.50***	
Appearance conversations	2.22	.42	.23	5.25***	
Anxiety \times appearance contingent self-worth	.14	.04	.17	3.86***	
Anxiety \times appearance conversations	.000	.04	.000	-.01	
Appearance contingent self-worth \times appearance conversations	1.45	.46	.15	3.16**	
Step 4					.42
BMI	.10	.10	.04	.95	
Anxiety	.22	.04	.26	5.28***	
Appearance contingent self-worth	2.60	.47	.27	5.50***	
Appearance conversations	2.28	.46	.23	5.01***	
Anxiety \times appearance contingent self-worth	.14	.04	.17	3.85***	
Anxiety \times appearance conversations	.01	.04	.01	.13	
Appearance contingent self-worth \times appearance conversations	1.44	.46	.15	3.14**	
Anxiety \times appearance contingent self-worth \times appearance conversations	-.01	.04	-.02	-.36	

BMI body mass index.

* $p < .05$,

** $p < .01$, *** $p < .001$

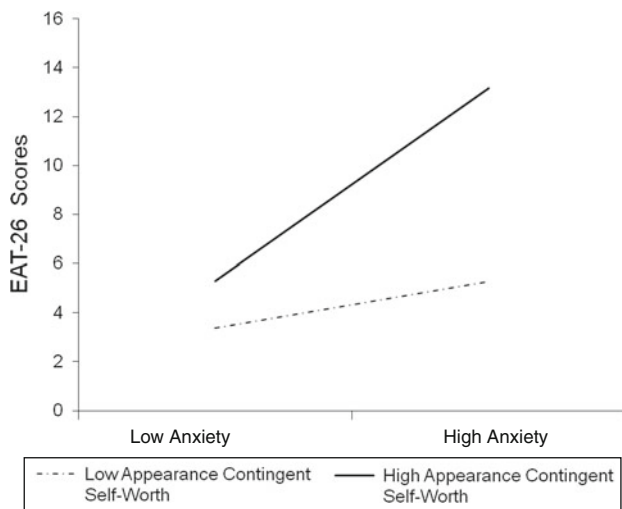


Fig. 1 Two-way interaction involving appearance contingent self-worth moderating the relation between anxiety and broad eating pathology (EAT-26 scores)

self-worth exhibited the most disordered eating (see Fig. 1; for all figures, high and low levels of the independent variables are derived from plus or minus one standard

deviation from the mean, respectively). Simple slope analyses indicated that anxiety was significantly associated with EAT-26 scores at high levels of appearance contingent self-worth, $\beta = .42, t(362) = 7.39, p < .001$, but not at low levels of appearance contingent self-worth, $\beta = .10, t(362) = 1.44, p = .150$.

The three-way interaction of anxiety x appearance contingent self-worth x appearance conversations with friends was not significant in identifying EDE-Q Restraint scores ($\beta = .01, t(409) = .24, \Delta R^2 = .000, p = .811$). When examining the two-way interactions involving anxiety in the context of the full model, the interaction of anxiety and appearance contingent self-worth accounted for unique variance in restraint, but the interaction of anxiety and appearance conversations did not (see Table 3). Similar to the finding for EAT-26 scores, the nature of the interaction was such that women high on anxiety who had high levels of appearance-contingent self-worth exhibited the most dietary restraint (see Fig. 2). Simple slope analyses indicated that anxiety was significantly associated with restraint at high levels of appearance contingent self-worth, $\beta = .49, t(409) = 9.08, p < .001$, as well as at low levels of appearance contingent self-worth,

Table 3 Hierarchical multiple regression analyses testing the interactive model involving anxiety, appearance contingent self-worth, and appearance conversations with friends with the dependent variable of dietary restraint, controlling for body mass index

Step and predictors	B	SE B	β	t	R ²
Step 1					.04
BMI	.06	.02	.19	3.97***	
Step 2					.36
BMI	.04	.01	.12	2.98**	
Anxiety	.04	.01	.42	9.07***	
Appearance contingent self-worth	.22	.05	.18	4.41***	
Appearance conversations					
Step 3					.38
BMI	.04	.01	.12	3.05**	
Anxiety	.04	.01	.39	8.41***	
Appearance contingent self-worth	.19	.06	.16	3.36**	
Appearance conversations	.19	.05	.16	3.82***	
Anxiety × appearance contingent self-worth	.01	.004	.11	2.57*	
Anxiety × appearance conversations	.003	.01	.03	.59	
Appearance contingent self-worth × appearance conversations	.11	.06	.09	1.89	
Step 4					.38
BMI	.04	.01	.12	3.04**	
Anxiety	.04	.01	.39	8.13***	
Appearance contingent self-worth	.19	.06	.16	3.33**	
Appearance conversations	.18	.05	.16	3.44**	
Anxiety × appearance contingent self-worth	.01	.004	.11	2.58*	
Anxiety × appearance conversations	.002	.01	.02	.44	
Appearance contingent self-worth × appearance conversations	.11	.06	.09	1.90	
Anxiety × appearance contingent self-worth × appearance conversations	.001	.004	.01	.24	

BMI body mass index.
 * $p < .05$. ** $p < .01$.
 *** $p < .001$

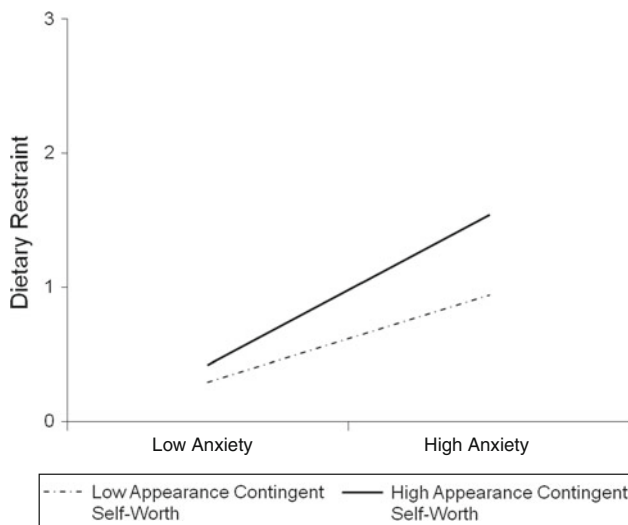


Fig. 2 Two-way interaction involving appearance contingent self-worth moderating the relation between anxiety and dietary restraint

$\beta = .29, t(409) = 4.15, p < .001$, albeit not as strongly based on inspection of the betas.

The three variables of anxiety, appearance contingent self-worth, and appearance conversations did interact to significantly identify binge eating frequency ($\beta = .13,$

Table 4 Hierarchical multiple regression analyses testing the interactive model involving anxiety, appearance contingent self-worth, and appearance conversations with friends with the dependent variable of binge eating frequency, controlling for body mass index

Step and predictors	B	SE B	β	<i>t</i>	<i>R</i> ²
Step 1					.02
BMI	.13	.05	.13	2.68**	
Step 2					.12
BMI	.09	.05	.09	2.00	
Anxiety	.07	.02	.23	4.16***	
Appearance contingent self-worth	.30	.22	.08	1.41	
Appearance conversations	.39	.18	.10	2.14*	
Step 3					.13
BMI	.09	.05	.10	2.03*	
Anxiety	.07	.02	.21	3.72***	
Appearance contingent self-worth	.37	.22	.10	1.70	
Appearance conversations	.32	.19	.09	1.73	
Anxiety × appearance contingent self-worth	.03	.02	.08	1.61	
Anxiety × appearance conversations	.02	.02	.06	1.03	
Appearance contingent self-worth × appearance conversations	.18	.21	.05	.85	
Step 4					.14
BMI	.09	.05	.09	1.99*	
Anxiety	.06	.02	.18	3.11**	
Appearance contingent self-worth	.34	.22	.09	1.58	
Appearance conversations	.16	.20	.04	.78	
Anxiety × appearance contingent self-worth	.03	.02	.09	1.79	
Anxiety × appearance conversations	.002	.02	.01	.09	
Appearance contingent self-worth × appearance conversations	.20	.21	.05	.98	
Anxiety × appearance contingent self-worth × appearance conversations	.03	.02	.13	2.18*	

BMI body mass index.
 * $p < .05$, ** $p < .01$,
 *** $p < .001$

$t(404) = 2.18, \Delta R^2 = .01, p = .030$), with the model accounting for about 14 % of the variance in binge eating (see Table 4). The nature of the interaction was such that those with high anxiety, high appearance contingent self-worth, and frequent appearance conversations with friends exhibited the most frequent binge eating (see Fig. 3). Simple slope analyses revealed the anxiety was significantly related to binge eating at the combination of high levels of appearance contingent self-worth and frequent appearance conversations with friends, $\beta = .36, t(404) = 4.63, p < .001$. Anxiety was not significantly related to binge eating at high appearance contingent self-worth/infrequent appearance conversations ($\beta = .16, t(404) = 1.79, p = .075$), at low appearance contingent self-worth/frequent appearance conversations ($\beta = .004, t(404) = .03, p = .973$), or at low appearance contingent self-worth/infrequent appearance conversations, $\beta = .18, t(404) = 1.83, p = .068$.

Discussion

As in prior work (e.g., Fitzsimmons and Bardone-Cone 2011), we found a strong relation between anxiety and

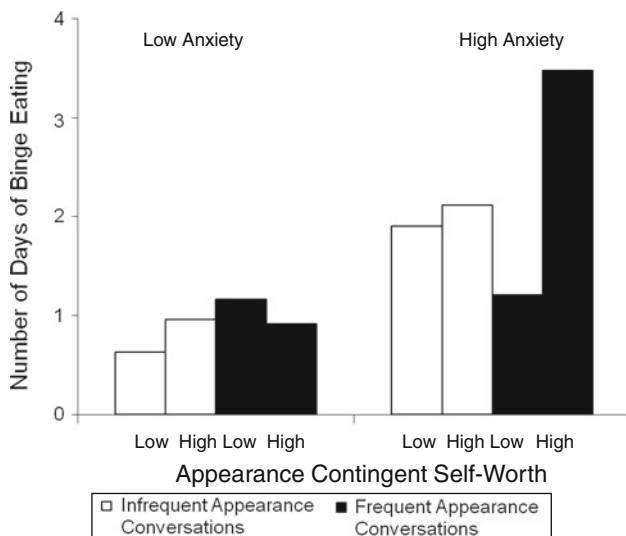


Fig. 3 Three-way interaction involving appearance contingent self-worth and appearance conversations with friends moderating the relation between anxiety and binge eating frequency (number of days of binge eating over the past 28 days)

disordered eating (r s from .30 to .53, p s < .001). The current study sought to identify conditions that strengthened this relation by examining whether appearance contingent self-worth and appearance conversations with friends might interact with anxiety to identify elevated levels of disordered eating, conceptualized as safety/avoidance behaviors. Our hypothesis for a three-way interactive model was supported for binge eating frequency, but not for EAT-26 scores or dietary restraint. These results indicate that individuals who were anxious, derived their sense of self-worth from appearance, and talked a lot about appearance with friends exhibited the highest frequency of binge eating (close to once per month). Theoretically, for these individuals, binge eating may serve as an escape from their anxiety, which is likely amplified by the moderators. That is, if an anxious person also places great importance on her appearance and is frequently reminded of her appearance shortcomings (in conversation with friends), anxious feelings may be exacerbated, which may motivate binge eating as an escape from aversive self-awareness and negative affect (Heatherton and Baumeister 1991).

In examining broad eating pathology (EAT-26 scores) and dietary restraint, we found that the interaction of anxiety and appearance contingent self-worth accounted for unique variance in these forms of disordered eating, but the interaction of anxiety and appearance conversations with friends did not. That is, when considering these two interactive effects jointly in the full three-way interactive model, it appears that the interaction involving appearance contingent self-worth is more important than the interaction involving appearance conversations in relation to disordered eating. In particular, individuals who were high

in anxiety and high in appearance contingent self-worth exhibited the most elevated levels of both broad eating pathology and dietary restraint. The differential finding for appearance contingent self-worth and appearance conversations suggests that, although appearance conversations with friends is related to disordered eating (see Table 1), it is the appearance focus that is more ingrained and connected to sense of self that is more important in combination with anxiety in identifying restrictive eating behavior. It is also interesting to consider the different findings for binge eating in contrast to dietary restraint and broader eating pathology. (Of note, while the EAT-26 captures eating pathology more broadly than data used from the EDE-Q, namely binge eating frequency and dietary restraint, it is generally considered to best capture anorexic attitudes/behaviors and, thus, is arguably a more similar construct to restraint than binge eating.) It may be that the combination of anxiety with high appearance contingent self-worth is more motivational and less daunting, with anxiety more easily attenuated via the use of dietary restraint as a safety behavior. In contrast, the combination of high anxiety, high appearance contingent self-worth, and frequent appearance conversations with friends may generate negative feelings about the self at a level that is more overwhelming and more likely to motivate an escape behavior such as binge eating rather than a restriction behavior.

The current study has several strengths including the large sample size, which provided enough power to adequately test a three-way interaction. Additionally, this study is unique in that it investigated the moderating roles of appearance contingent self-worth and appearance-based conversations in the anxiety/disordered eating relation across a variety of disordered eating behaviors; to our knowledge, this is the first work connecting appearance conversations with friends to eating pathology. Finally, the remote online data collection nature of this study may have encouraged more honest responding, since the participants were able to complete the survey in the privacy of their own homes; this may have been especially important given that we were asking about sensitive topics related to disordered eating (Joinson, 2001).

One limitation of the present study is its cross-sectional nature. While we conceptualized anxiety as driving disordered eating as safety behaviors (in the context of the moderators studied) and while this temporal ordering of anxiety and disordered eating/eating disorders has empirical support (e.g., Kaye et al. 2004), it could be that the relation between anxiety and disordered eating is bidirectional; longitudinal data are needed to clarify these temporal relations, taking into consideration appearance contingent self-worth and appearance-based conversations. Another limitation is generalizability. These findings may

be limited to college females; future work should examine different age groups, males, specific ethnic/racial minorities, and clinical samples. For example, while adolescent males appear to engage in fewer appearance conversations with friends than adolescent females, they appear to talk about muscle building with their friends more than girls talk with their friends about dieting (Jones and Crawford, 2006). How these sorts of friend conversations may influence the relation between anxiety and disordered body-related behaviors in males is not clear. The measure used to assess appearance conversations also has limitations. In particular, we note that while it attempts to capture joint conversations about one's appearance with friends, individuals could endorse items based on themselves *or* their friends doing most of the appearance talking.

The results of this study have clinical implications related to when anxiety may be associated with disordered eating and related to points of intervention. For example, considering the three-way interaction and its depiction in Fig. 3, it appears that targeting either appearance contingent self-worth or appearance-based conversations with friends should decrease binge eating in the context of anxiety, if the model is causal. Clinicians may help clients decrease their appearance conversations by assigning self-monitoring activities, collaboratively identifying under what circumstances the client may be more likely to engage in such conversations (i.e., what are her “triggers”), and engaging in a discussion about what these appearance conversations offer. To the degree that talking with friends about appearance increases a sense of intimacy with friends (similar to co-rumination more broadly; Rose, 2002), this would have to be weighed against the amplified negative affect such conversations may generate and their contribution to binge eating. Appearance contingent self-worth is also worthy of therapeutic intervention, including an examination of how this reliance on appearance aligns with the client's self-reported values and goals. Clinicians can collaboratively explore other domains of self-worth with the client and develop cognitive and behavioral plans to increase the client's sense of worth within diverse, non-appearance areas of her life.

Future research should investigate specific domains of anxiety, including a focus on social anxiety (in particular, fears of negative evaluation) and social physique anxiety. Wonderlich-Tierney and Vander Wal (2010) provide some support for the need for this specificity, finding that fear of negative evaluation (the cognitive component of social anxiety), but not social anxiety broadly assessed, was associated with eating disorder symptoms. Methodologically, conversations with friends about appearance could be studied using different approaches that remove potential reporting bias. For example, instead of asking participants to recall the frequency with which they have these

conversations, an electronically activated recorder could be used to record small portions of conversation at regular intervals across days, which could be transcribed to provide more objective data on appearance conversations. This methodology would also permit the assessment of the valence of the conversations in order to examine if appearance conversations with a negative focus especially motivate disordered eating behaviors, as well as the assessment of what proportion of conversations the participant vs. friends are talking about appearance. Alternatively, collateral reports of close friends could be combined with individuals' self-reports about appearance conversations. Another line of future research involves explicitly assessing race/ethnicity. Perhaps friends of certain races/ethnicities may be more encouraging (or more discouraging) of certain body types, which would produce qualitatively different appearance conversations and could influence the type and frequency of disordered eating. For example, while African American females appear to be more oriented toward appearance than their Caucasian non-Hispanic and Hispanic peers (Gillen and Lefkowitz 2012), they also tend to have better body image and lower rates of restrictive behaviors (Grabe and Hyde 2006; Taylor et al. 2007), perhaps in part because the orientation toward appearance, including how it is talked about with friends, is more positive. Lastly, other complex models of anxiety/disordered eating should be examined. As an example of a model involving moderation and mediation, it may be that the combination of high anxiety and high appearance contingent self-worth motivates social comparison, resulting in body dissatisfaction and resultant disordered eating such as dieting to try to alter one's body.

In conclusion, anxiety, appearance contingent self-worth, and appearance conversations with friends interacted to identify binge eating frequency. Additionally, results indicated that appearance contingent self-worth moderated the relations between anxiety and broader eating pathology (i.e., EAT-26 scores) and between anxiety and dietary restraint. Our results generally suggest that low levels of anxiety are associated with low levels of disordered eating (i.e., EAT-26 scores, dietary restraint, binge eating), regardless of one's level of appearance contingent self-worth or frequency of appearance conversations with friends. However, for those with high levels of anxiety, elevated levels of appearance contingent-self worth (and, in the case of binge eating, frequent appearance conversations with friends) are associated with the highest levels of disordered eating. Thus, the current study provides researchers and clinicians with a better understanding of who experiences various types of disordered eating in association with anxiety. We theorize that these disordered eating behaviors may function as safety behaviors and avoidance strategies, enacted in response to anxiety given the individual's

appearance focus. Clinicians working with clients with anxiety and disordered eating may wish to explore the potential safety/avoidance behavior functions that disordered eating behaviors serve and work with their client to identify more adaptive ways of managing anxiety, as well as examine appearance contingent self-worth and appearance conversations with friends as factors that exacerbate the association between anxiety and disordered eating.

References

- Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Thousand Oaks, CA: Sage Publications.
- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed.—Text Revision). Washington, DC: Author.
- Anderson, D. A., & Williamson, D. A. (2002). Outcome measurement in eating disorders. In W. W. IsHak, T. Burt, & L. I. Sederer (Eds.), *Outcome measurement in psychiatry: A critical review* (pp. 289–301). Washington, DC: American Psychiatric Press.
- Arnow, B., Kenardy, J., & Agras, W. S. (1992). Binge eating among the obese: A descriptive study. *Journal of Behavioral Medicine*, *15*, 155–170. doi:10.1007/BF00848323.
- Beck, A. T., Emery, G., & Greenberg, R. (1985). *Anxiety disorders and phobias: A cognitive perspective*. New York: Basic Books.
- Cain, A. S., Bardone-Cone, A. M., Abramson, L. Y., Vohs, K. D., & Joiner, T. E. (2010). Prospectively predicting dietary restraint: The role of interpersonal self-efficacy, weight/shape self-efficacy, and interpersonal stress. *International Journal of Eating Disorders*, *43*, 505–512. doi:10.1002/eat.20740.
- Carter, P. I., & Moss, R. A. (1984). Screening for anorexia and bulimia nervosa in a college population: Problems and limitations. *Addictive Behaviors*, *9*, 417–419. doi:10.1016/0306-4603(84)90045-5.
- Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences* (3rd ed.). Mahwah, NJ: Lawrence Erlbaum.
- Crocker, J., Luhtanen, R. K., Cooper, M. L., & Bouvrette, A. (2003). Contingencies of self-worth in college students: Theory and measurement. *Journal of Personality and Social Psychology*, *85*, 894–908. doi:10.1037/0022-3514.85.5.894.
- Crocker, J., & Wolfe, C. T. (2001). Contingencies of self-worth. *Psychological Review*, *108*, 593–623. doi:10.1037/0033-295X.108.3.593.
- Fairburn, C. G., & Beglin, S. J. (2008). Eating Disorder Examination-Questionnaire (EDE-Q 6.0). In C. G. Fairburn (ed.). *Cognitive behavior therapy and eating disorders*. New York: Guilford Press. Appendix II.
- Fitzsimmons, E. E., & Bardone-Cone, A. M. (2011). Coping and social support as potential moderators of the relation between anxiety and eating disorder symptomatology. *Eating Behaviors*, *12*, 21–28. doi:10.1016/j.eatbeh.2010.09.002.
- Forbush, K. T., South, S. C., Krueger, R. F., Iacono, W. G., Clark, L. A., Keel, P., et al. (2010). Locating eating pathology within an empirical diagnostic taxonomy: Evidence from a community-based sample. *Journal of Abnormal Psychology*, *119*, 282–292. doi:10.1037/a0019189.
- Frazier, P. A., Tix, A. P., & Barron, K. E. (2004). Testing moderator and mediator effects in counseling psychology research. *Journal of Counseling Psychology*, *51*, 115–134. doi:10.1037/0022-0167.51.1.115.
- Garner, D. M., Olmsted, M. P., Bohr, Y., & Garfinkel, P. E. (1982). The Eating Attitudes Test: Psychometric features and clinical correlates. *Psychological Medicine*, *12*, 871–878. doi:10.1017/S0033291700049163.
- Geller, J., Johnston, C., Madsen, K., Goldner, E. M., Remick, R. A., & Birmingham, C. L. (1998). Shape- and weight-based self-esteem and the eating disorders. *International Journal of Eating Disorders*, *24*, 285–298. doi:10.1002/(SICI)1098-108X(199811)24:3<285:AID-EAT6>3.0.CO;2-I.
- Gillen, M. M., & Lefkowitz, E. S. (2012). Gender and racial/ethnic differences in body image development among college students. *Body Image*, *9*, 126–130. doi:10.1016/j.bodyim.2011.09.004.
- Grabe, S., & Hyde, J. S. (2006). Ethnicity and body dissatisfaction among women in the United States: A meta-analysis. *Psychological Bulletin*, *132*, 622–640. doi:10.1037/0033-2909.132.4.622.
- Heatherton, T. F., & Baumeister, R. F. (1991). Binge eating as escape from self-awareness. *Psychological Bulletin*, *110*, 86–108. doi:10.1037/0033-2909.110.1.86.
- Hedberg, A. G. (1972). Review of state-trait anxiety inventory. *Professional Psychology*, *3*, 389–390. doi:10.1037/h0020743.
- Helbig-Lang, S., & Petermann, F. (2010). Tolerate or eliminate? A systematic review on the effects of safety behavior across anxiety disorders. *Clinical Psychology: Science and Practice*, *17*, 218–233. doi:10.1111/j.1468-2850.2010.01213.x.
- Hoerr, S. L., Bokram, R., Lugo, B., Bivins, T., & Keast, D. R. (2002). Risk for disordered eating relates to both gender and ethnicity for college students. *Journal of the American College of Nutrition*, *21*, 307–314.
- Joinson, A. N. (2001). Self-disclosure in computer-mediated communication: The role of self-awareness and visual anonymity. *European Journal of Social Psychology*, *31*, 177–192. doi:10.1002/ejsp.36.
- Jones, D. C. (2004). Body image among adolescent girls and boys: A longitudinal study. *Developmental Psychology*, *40*, 823–835. doi:10.1037/0012-1649.40.5.823.
- Jones, D. C., & Crawford, J. K. (2006). The peer appearance culture during adolescence: Gender and body mass variations. *Journal of Youth and Adolescence*, *35*, 257–269. doi:10.1007/s10964-005-9006-5.
- Jones, D. C., Vigfusdottir, T. H., & Lee, Y. (2004). Body image and the appearance culture among adolescent girls and boys: An examination of friend conversations, peer criticism, appearance magazines, and the internalization of appearance ideals. *Journal of Adolescent Research*, *19*, 323–339. doi:10.1177/0743558403258847.
- Kaye, W. H., Bulik, C. M., Thornton, L., Barbarich, N., Masters, K., & the Price Foundation Collaborative Group. (2004). Comorbidity of anxiety disorders with anorexia and bulimia nervosa. *The American Journal of Psychiatry*, *161*, 2215–2221. doi:10.1176/appi.ajp.161.12.2215.
- King, M. B. (1989). Eating disorders in general practice population: Prevalence, characteristics and follow-up at 12 to 18 months. *Psychological Medicine, Monograph, Suppl 14*, 1–34. doi:10.1017/S0264180100000515.
- King, M. B. (1991). The natural history of eating pathology in attenders to primary medical care. *International Journal of Eating Disorders*, *10*, 379–387. doi:10.1002/1098-108X(199107)10:4<379:AID-EAT2260100402>3.0.CO;2-I.
- Krahn, D. D., Kurth, C. L., Gomberg, E., & Drewnowski, A. (2005). Pathological dieting and alcohol use in college women—a continuum of behaviors. *Eating Behaviors*, *6*, 43–52. doi:10.1016/j.eatbeh.2004.08.004.
- Lawler, M., & Nixon, E. (2011). Body dissatisfaction among adolescent boys and girls: The effects of body mass, peer appearance culture an internalization of appearance ideals. *Journal of Youth and Adolescence*, *40*, 59–71. doi:10.1007/s10964-009-9500-2.

- 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, 349–351. doi:10.1002/(SICI)1098-108X(199904)25:3<349:AID-EAT15>3.0.CO;2-M.
- Mathews, A., & Macleod, C. (1994). Cognitive approaches to emotion and emotional disorders. *Annual Review of Psychology*, 45, 25–50. doi:10.1146/annurev.ps.45.020194.000325.
- Metzger, R. L. (1976). A reliability and validity study of the State-Trait Anxiety Inventory. *Journal of Clinical Psychology*, 32, 276–278. doi:10.1002/1097-4679(197604)32:2<276:AID-JCLP270320215>3.0.CO;2-G.
- Neumark-Sztainer, D. R., Wall, M. W., Haines, J. I., Story, M. T., Sherwood, N. E., & van den Berg, P. A. (2007). Shared risk and protective factors for overweight and disordered eating in adolescents. *American Journal of Preventive Medicine*, 33, 359–369. doi:10.1016/j.amepre.2007.07.031.
- Pallister, E., & Waller, G. (2008). Anxiety in the eating disorders: Understanding the overlap. *Clinical Psychology Review*, 28, 366–386. doi:10.1016/j.cpr.2007.07.001.
- Ramanaiah, N. V., Franzen, M., & Schill, T. (1983). A psychometric study of the State-Trait Anxiety Inventory. *Journal of Personality Assessment*, 47, 531–535. doi:10.1207/s15327752jpa4705_14.
- Rose, A. J. (2002). Co-rumination in the friendships of girls and boys. *Child Development*, 73, 1830–1843. doi:10.1111/1467-8624.00509.
- Salkovskis, P. M. (1991). The importance of behaviour in the maintenance of anxiety and panic: A cognitive account. *Behavioural Psychotherapy*, 19, 6–19. doi:10.1017/S0141347300011472.
- Spencer, J. A., & Fremouw, W. J. (1979). Binge eating as a function and restraint and weight classification. *Journal of Abnormal Psychology*, 88, 262–267. doi:10.1037/0021-843X.88.3.262.
- Spielberger, C. D., Gorsuch, R. L., & Lushene, R. E. (1970). *STAI manual for the State-Trait Anxiety Inventory*. Palo Alto, CA: Consulting Psychologists Press.
- Stice, E. (2002). Risk and maintenance factors for eating pathology: A meta-analytic review. *Psychological Bulletin*, 128, 825–848. doi:10.1037/0033-2909.128.5.825.
- Swinbourne, J. M., & Touyz, S. W. (2007). The comorbidity of eating disorders and anxiety disorders: A review. *European Eating Disorders Review*, 15, 253–274. doi:10.1002/erv.784.
- Taylor, J. Y., Caldwell, C. H., Baser, R. E., Faison, N., & Jackson, J. S. (2007). Prevalence of eating disorders among Blacks in the National Survey of American Life. *International Journal of Eating Disorders*, 40, S10–S14.
- Taylor, S., Koch, W. J., & McNally, R. J. (1992). How does anxiety sensitivity vary across the anxiety disorders? *Journal of Anxiety Disorders*, 6, 249–259. doi:10.1016/0887-6185(92)90037-8.
- Watson, D., & Clark, L. A. (1984). Negative affectivity: The disposition to experience aversive emotional affects. *Psychological Bulletin*, 55, 465–490. doi:10.1037/0033-2909.96.3.465.
- Wonderlich-Tierney, A. L., & Vander Wal, J. S. (2010). The effects of social support and coping on the relationship between social anxiety and eating disorders. *Eating Behaviors*, 11, 85–91. doi:10.1016/j.eatbeh.2009.10.002.