**Young Adolescents' Body Dysmorphic Symptoms: Associations with Same- and Cross-Sex
Peer Teasing via Appearance-based Rejection Sensitivity**

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Abstract

In this study of young adolescents' ($N = 188$, $M_{\text{age}} = 11.93$, 54.8% females) body dysmorphic disorder (BDD) symptoms, we examined a theoretically-derived model to determine if symptoms could be explained by appearance-related teasing, general peer victimization, and social anxiety. BDD symptoms were assessed as distressing preoccupation with perceived appearance defects, and social avoidance and repeated grooming and appearance checking. Associations were expected to occur via the social-perceptual bias known as appearance-based rejection sensitivity (appearance-RS). The source of appearance teasing was also considered (same-sex vs. cross-sex peers), and age and gender moderation were assessed. As predicted, in a structural equation model, BDD symptoms were higher when adolescents self-reported more appearance teasing and higher social anxiety. Moreover, it was appearance teasing by cross-sex peers, rather than same-sex peers, that was uniquely associated with elevated BDD symptoms. These associations were partially mediated by appearance-RS. Notably, peer-reported general victimization was not associated with BDD symptoms. There was no evidence for gender moderation, but some age moderation was found, with stronger associations usually found among older compared to younger adolescents. The findings suggest that appearance-related social adversity, particularly cross-sex teasing, is linked with greater concerns about rejection due to appearance and, in turn, heightened BDD symptoms. This has important implications for understanding the development and treatment of BDD. Continued research to identify the social experiences and interpretative biases that contribute to BDD symptomology is needed.

Keywords: Body dysmorphic disorder; peer victimization; social anxiety, appearance-based rejection sensitivity; adolescents

Young Adolescents' Body Dysmorphic Symptoms: Associations with Same- and Cross-Sex Peer Teasing via Appearance-based Rejection Sensitivity

Body dysmorphic disorder (BDD) is a disabling condition involving distressing preoccupation with one or more perceived appearance defects (Phillips, 1991). Sufferers have reported protracted mental preoccupation coupled with repetitive behaviors to inspect, conceal, or improve the perceived flaw, such as mirror checking or excessive grooming (Hartmann, Greenberg, & Wilhelm, 2013; Phillips, McElroy, Keck, Pope, & Hudson, 1993). Research shows that BDD is more prevalent in females, and any body part can be the focus of concerns (Hartmann et al., 2013; Phillips, Menard, Fay, & Weisberg, 2005). However, the most common concerns involve skin (80.0%), hair (57.5%), and nose (39.0%), as well as teeth, eyes and eyebrows, stomach, weight, breasts, thighs and legs (Albertini & Phillips, 1999; Phillips et al., 2005). BDD sufferers experience significant impairment in functioning, including disruptions to daily life, social, educational and occupational withdrawal, and elevated rates of suicidality (Phillips & Menard, 2006). Comorbidities are common, including substance use disorders, mood disorders, obsessive-compulsive disorder (OCD), and social phobia, to name a few (Phillips et al., 2005). Although there has been no previous developmental study of BDD in children or young adolescents, adults' retrospective reports suggest that onset typically occurs during adolescence (Bjornsson et al., 2013; Phillips et al., 2006), and BDD and related symptoms have been documented in children as young as six years of age (Albertini & Phillips, 1999).

Such evidence of BDD onset in children and adolescents makes it apparent that symptoms can arise early, but, as has been suggested in studies of adults, these early symptoms also suggest that the disorder is likely to be, at least partly, founded in childhood social experiences (Phillips, 1991). Adulthood BDD has been shown to be associated with selected and distorted processing of social and emotional information, whereby BDD sufferers show difficulty recognizing others'

emotional expressions, misinterpretation of others' emotional expressions as angry (in self-referent scenarios), elevated distractibility by emotional cues, selective attending to perceived defects when viewing their own face and unfamiliar faces, and threat misinterpretation of a number of ambiguous scenarios (i.e., BDD-related, social, and general scenarios; Buhlmann, Etcoff, & Wilhelm, 2006; Buhlmann, McNally, Etcoff, Tuschen-Caffier, & Wilhelm, 2004; Buhlmann, McNally, Wilhelm, & Florin, 2002; Buhlmann et al., 2002b; Grocholewski, Kliem, & Heinrichs, 2012). In many theories (e.g., rejection sensitivity theory, cognitive models of depression, and attachment theory; Beck, 2008; Bowlby, 1988; Downey, Khouri, & Feldman, 1997), selected and distorted information processing is argued to follow from early social adversity, such as parental abuse, peer victimization and teasing, or peer exclusion and ostracism. A recent study of university students confirmed these associations between social adversity and BDD symptoms (Lavell, Zimmer-Gembeck, Farrell, & Webb, in press), whereby appearance-based teasing by peers and fear of negative evaluation were associated with more self-reported BDD symptoms. These associations were partially mediated by appearance-based rejection sensitivity (appearance-RS), defined as the tendency to anxiously expect, readily perceive, and over-react to rejection based on how one looks (Park, 2007).

When taken together, these previous studies suggest that social adversity and biased processing of social information are some of the important correlates of BDD symptoms. Moreover, a complex model is emerging whereby adverse social experiences and general fears of evaluation by others are associated with BDD but these effects are, at least partly, dependent on a social information processing system that is primed to perceive rejection and to attribute this rejection to appearance deficits. Despite the evidence of these specific social experiences and social-perceptual biases as correlates of BDD, these factors have not been examined as correlates of BDD symptoms in childhood or early adolescence. In the present study of early adolescents the aim was to verify whether social experiences with peers, which are very salient to early adolescents, and biased social

information processing are correlates of BDD symptoms. In addition, this model was extended to consider the source of peer teasing, whether it was by same-sex or cross-sex peers.

Peer Teasing about Appearance and Social Anxiety as Correlates of BDD Symptoms

In support of the cognitive behavioral model of BDD, which suggests that childhood social adversity may be etiologically linked with BDD symptoms (Veale, 2004), researchers have shown that BDD sufferers spontaneously recall more negative and vivid appearance-related images and impressions than control participants, when thinking about a time when they felt worried or anxious about their appearance (Osman, Cooper, Hackmann, & Veale, 2004). Moreover, BDD sufferers retrospectively report more frequent appearance- and competency-related teasing from peers than healthy controls (Buhlmann, Cook, Fama, & Wilhelm, 2007) and remember appearance-related teasing experiences as more vivid and traumatic than control participants (Buhlmann et al., 2011). No previous studies have examined the link between BDD symptoms and concurrent or more recent peer victimization experiences.

On the other hand, researchers have given significant attention to peer victimization of young people in relation to body dissatisfaction (Webb & Zimmer-Gembeck, in press). Whereas BDD reflects obsessive mental preoccupation and repetitive behaviors relating to a perceived defect of any appearance attribute, body dissatisfaction involves negative thoughts and feelings about body weight and/or shape specifically (Buhlmann et al., 2011; Grogan, 2008). Further highlighting the potential importance of social adversity to appearance concerns, peer victimization specific to appearance, as well as more general victimization and social exclusion, have been found to concurrently and prospectively predict body dissatisfaction in children and adolescents (Lunde, Frisen, & Hwang, 2006; Paxton, Eisenberg, & Neumark-Sztainer, 2006).

When examining the source of peer victimization more closely, researchers have noted some important yet conflicting differences. Using vignettes to identify social constructions of the

acceptability of same-sex and cross-sex bullying, O'Brien (2011) found that adolescents considered bullying of male and female victims by a female perpetrator to be least acceptable. In contrast, Felix and McMahon (2006) found that among male and female adolescents, being victimized by a male peer was associated with poorer psychological adjustment, including internalizing symptoms for female victims, and both internalizing and externalizing symptoms for male victims. These findings highlight the potential for differences in the association between same-sex versus cross-sex appearance teasing and psychological functioning – differences that may be particularly important to consider during a period of development when interest in cross-sex peers is increasing (Collins & Laursen, 2004; Collins, Welsh, & Furman, 2009; Zimmer-Gembeck, 1999; Zimmer-Gembeck, Seibenbruner, & Collins, 2001).

Both BDD symptomology and appearance-RS have been shown to be associated with biased threat perception, whereby individuals misinterpret ambiguous stimuli as threatening (Buhlmann et al., 2002b; Park & Harwin, 2010). Thus, it is difficult to determine whether BDD sufferers actually experience higher levels of social adversity like teasing by peers, or whether distorted information processing may bias their perception and recall of victimization experiences. Therefore, in addition to self-reported peer appearance teasing, we assessed peer-reported victimization, whereby all participants identified peers who were victimized in their classrooms, to examine whether victimization as witnessed by others was also linked with BDD symptoms.

Social anxiety symptoms have been proposed to precede, and perhaps pose a risk factor for, the development of BDD (Fang & Hofmann, 2010). While considered distinct conditions, BDD and social phobia share many clinical and maintaining features, including fear of negative evaluation, social avoidance, excessive social comparison, and negative interpretation bias for social information (Kaplan, Rossell, Enticott, & Castle, 2013). It has been noted that social anxiety symptoms may uniquely contribute to the functional impairment experienced by BDD sufferers

(Kelly, Walkers, & Phillips, 2010), and treatment of social phobia has been shown to produce improvements in BDD symptomology (Fang, Sawyer, Aderka, & Hofmann, 2013). Due to the important links between these conditions, the present study assessed social anxiety symptoms.

Appearance-Based Rejection Sensitivity as Mediator

Similar to research on general rejection sensitivity that has shown that it is a mediator linking social adversity to symptoms of mental health problems (London, Downey, Bonica, & Paltin, 2007; Rudolph & Zimmer-Gembeck, 2014; Zimmer-Gembeck, Trevaskis, Nesdale, & Downey, 2013), heightened sensitivity in the form of greater expectations and anxiety about rejection because of physical appearance, recently labeled as appearance-based rejection sensitivity (*appearance-RS*), may partially explain why adverse social experiences and social anxiety are associated with greater symptoms of BDD (Fang et al., 2011; Lavell et al., in press). Like BDD, appearance-RS is thought to develop from a history of victimization (Park, 2007). Rejection experiences that are tied to appearance, whether real or perceived, are expected to leave a psychological legacy in the form of increased anxiety about and expectation of social rejection because of appearance. Thus, a history of rejection experiences contributes to a bias to perceiving future rejection, with these heightened perceptions of rejection resulting in distress and self-fulfilling maladaptive responses (e.g., social withdrawal and aggression; London et al., 2007; Zimmer-Gembeck & Nesdale, 2013). Adverse social experiences, such as peer appearance teasing, and fears of negative evaluation, are theorized to be linked with BDD at least partially via appearance-RS, as individuals are primed to perceive rejection and to attribute this rejection to appearance deficits. When individuals have this elevated social-cognitive-emotional bias to perceived rejection, react strongly to it, and attribute it to their appearance, symptoms of BDD may escalate as they increasingly focus on their appearance deficits and become more compulsive about their appearance concerns. This suggests a path from social adversity to BDD via appearance-RS.

A similar argument could be made for social anxiety. Amongst individuals who report heightened fears of negative evaluation (the key component of social anxiety), experiencing elevated concerns about and expectations of social rejection specific to one's appearance may result in increasing appearance concerns and compulsive behaviors intended to reassure, augment or conceal one's appearance. Accordingly, Lavell et al. (in press) found that the association between peer appearance teasing and young adults' BDD symptoms, as well as between social anxiety and BDD symptoms, was partially mediated by appearance-RS.

Age and Gender

The onset of BDD tends to occur during adolescence, with one study reporting that the most common age of onset was 12 to 13 years (Bjornsson et al., 2013). In this study, earlier onset was linked with a lifetime history of attempted suicide, and greater comorbidity. Moreover, BDD has been found to be more prevalent among females than males (Albertini & Phillips, 1999; Buhlmann et al., 2007). Notably however, no previous research was found that examined whether gender or age moderated associations between BDD and other important correlates. More broadly, there is debate as to whether males and females are differentially affected by victimization (e.g., Breslau, Chilcoat, Kessler, Peterson, & Lucia, 1999), however Pimlott-Kubiak and Cortina (2003) found that in their large study ($N = 16,000$), females were not at increased risk of psychopathology compared to males following a range of adverse experiences, including sexual violence, physical or emotional abuse, and stalking (i.e., no gender moderation). As such, we assessed age and gender differences because mean level differences were expected, with increasing symptoms with age and more symptoms among girls than boys. Although no literature on BDD was available to make specific hypotheses regarding whether associations would differ by age or between boys and girls, we also examined age and gender moderation in our proposed model.

Study Aim and Hypotheses

The aim of the present study was to examine a model linking self- and peer-reported victimization and social anxiety with BDD symptoms in adolescent boys and girls, via appearance-RS. Young people with greater exposure to appearance teasing and general victimization by peers, and higher symptoms of social anxiety were expected to report greater BDD symptoms, and these associations were expected to occur via the mediating role of appearance-RS. Moreover, the source of peer teasing was considered by testing a model that examined teasing by same-sex peers separate from teasing by cross-sex peers. Finally, age and gender moderation were assessed. Given that researchers have shown the mean age of onset of clinical BDD to range from 11.8 to 16.7 years (Albertinti & Phillips, 1999; Bjornsson et al., 2013), with onset occurring most commonly at 12 to 13 years (Bjornsson et al., 2013; Phillips et al., 2005), the present study sampled young adolescents aged 10 to 13 years, to capture the period of development when BDD symptomology is likely to emerge. The hypotheses tested in this study are listed below.

1. Peer appearance teasing, general peer victimization, and social anxiety symptoms will be associated with more BDD symptoms.
2. Appearance-RS will be associated with more exposure to peer teasing, more social anxiety symptoms, and more BDD symptoms.
3. Appearance-RS will mediate the associations of peer appearance teasing, general peer victimization, and social anxiety with BDD symptoms.
4. Teasing from same-sex and cross-sex peers will each be uniquely associated with more BDD symptoms.

Method

Participants

Participants were 188 students (85 males, 103 females) from three independent schools in an urban area of Australia. Participants were 10 to 13 years old ($M_{\text{age}} = 11.93$, $SD = 0.90$), and were

predominantly white/Caucasian (76.7%), or Asian (15.9%). This study comprises a subset of participants drawn from a larger study ($N = 393$), with participants who completed the relevant measures being included. Chi-square analyses and independent group t -tests showed that the subsample used in the present study did not differ on any demographic or other measured variable from the excluded participants ($ps > .07$). The overall response rate was 42.4%. Of the students who did not participate, 15.7% of parents actively declined participation, and the remainder failed to return parental consent forms to the school.

Procedure

Study approval was obtained from the university Human Research Ethics Committee. Active parental consent was obtained, with consent forms sent home with children and returned to the school. The class within each grade, at each school, that returned the most consent forms (regardless of whether parental consent to participate was provided) was awarded a cupcake party. Participating students also received a small gift when the survey was completed. The questionnaire, which comprised additional measures not included in this paper, was completed by participants in their regular classrooms, taking approximately 60 minutes.

Measures

BDD symptoms. The 10-item Appearance Anxiety Inventory (AAI; Veale et al., 2014) was used to assess BDD symptoms. This measure includes items that are indicative of symptoms of BDD as described in the DSM-V, including obsessional thoughts and repeated behaviors. An example item is: “I check my appearance (e.g., in mirrors, with photos)”. Participants indicated on a 5-point scale the frequency with which they experienced BDD symptoms (0 = *Never*, 4 = *Always or almost always*). The total score was formed by summing all items, with a possible range of 0 to 40. Cronbach’s α was .94 for girls and .83 for boys. Veale and colleagues (2014) calculated a median

score of 27 (IQR = 12) for a sample of BDD sufferers, and a median score of 13 (IQR = 13.5) for a community sample. The median score on the AAI in the present study was 7 (IQR = 10), with 20 adolescents (10.6%) showing elevated symptomology, scoring 20 or higher (half way between the median of the BDD and community samples).

Self-reported appearance teasing by peers. Three items derived from the Weight Teasing Subscale of the Perceptions of Teasing Scale (POTS; Thompson, Cattarin, Fowler, & Fisher, 1995) were used to assess appearance teasing from peers. An example item is: “Do people your age (your PEERS) make fun of you because of your weight or looks?” Participants rated the frequency of teasing from their same-sex peers, and their cross-sex peers (1 = *never*, 5 = *very often*), as well as their degree of distress (1 = *not upset*, 5 = *very upset*). The average of the product of the teasing frequency and teasing distress items formed the total appearance teasing score, for both the same-sex and cross-sex subscales. In girls, Cronbach’s α was .87 and .85 for same-sex and cross-sex teasing, respectively. In boys, Cronbach’s α was .81 and .72 for same-sex and cross-sex teasing, respectively.

Peer-reported general victimization. Five items drawn from the Children's Social Behavior Scale (Crick and Grotpeter, 1995) were used to assess peer-reported victimization. Students nominated up to three classmates who best fit five behavioral descriptors reflecting verbal and relational victimization (e.g., “Who in your grade is ignored on purpose?”, “Who is made fun of by others in your grade”, “Who do students often say mean things about behind their back?”). Nominations were received from 97.7% of participants, and nominations from the full participant sample ($N = 393$) were utilized. All classmates could be nominated, regardless of participation. Nominations received by each student for each item were summed and standardized within classrooms to adjust for unequal class sizes, then averaged to form a total score for each participant.

Social anxiety. The 18-item Social Anxiety Scale for Children – Revised (La Greca & Stone, 1993) was used to assess symptoms of social anxiety. An example item is: “I worry about doing something new in front of others.” Participants indicated on a 5-point scale how much they felt each statement was true for them (1 = *not true*, 5 = *very true*). Averaging all items formed the total score, with Cronbach’s α being .89 for girls and .88 for boys. According to the recommended cutoffs (La Greca, 1999), 13 boys (15.3%) and 25 girls (24.3%) were classified as high social anxiety.

Appearance-RS. Appearance-RS was measured using the Adolescent Appearance-RS Scale (Webb, Zimmer-Gembeck, & Donovan, 2014), which was modified from the Appearance-RS Scale (Park, 2007), to be appropriate for adolescents. Participants were asked to imagine themselves in 10 hypothetical scenarios (e.g., “Your boyfriend/girlfriend of 3 months is considering breaking up with you”), and indicate on a 6-point scale their anxiety/concern about being rejected based on their appearance (e.g., “How concerned or anxious would you be that he/she wants to break up with you because of the way you look?”; 1 = *not concerned*, 6 = *very concerned*), and their expectation of appearance-related rejection in the imagined scenario (e.g., “Do you think your boyfriend/girlfriend is considering breaking up with you because of the way you look?”; 1 = *No!!*, 6 = *Yes!!*). In accordance with scoring of the original Appearance-RS Scale (Park, 2007) and the Children’s Rejection Sensitivity Questionnaire (Downey, Lebolt, Rincon, & Freitas, 1998), anxious concern was multiplied by expectation of rejection for each item, and these 10 product scores were averaged to form the total score. A higher score indicated greater appearance-RS. Cronbach’s α was .93 for girls and .85 for boys. The Appearance-RS Scale has been used previously in young adolescents with a mean age of 13.1 and 13.8 years (Bowker, Thomas, Spencer, & Park, 2013; Webb et al, 2014), while a similar question format has been used to assess general rejection sensitivity in adolescents with a mean age of 11.5 years (Downey et al., 1998).

Overview of Analyses

Descriptive statistics and *t*-tests were conducted in order to assess gender differences. After examining correlations between all measures, SEM using AMOS software (IBM Corporation) was performed to test the primary hypotheses. These models were used to estimate the direct and indirect effects of social anxiety, peer appearance teasing, general victimization, and appearance-RS with BDD symptoms (Model 1), and between social anxiety, peer appearance teasing from same-sex and cross-sex peers, appearance-RS and BDD symptoms (Model 2). To test hypotheses regarding indirect pathways, bootstrapping was used to estimate standard errors and 95% confidence intervals for all direct and indirect effects. Finally, multiple group SEM was employed to test gender and age differences in Model 2.

Results

Means, Standard Deviations, and Gender Differences

Table 1 presents the *M*s and *SD*s for girls and boys. Independent groups *t*-tests showed that girls, compared to boys, reported more appearance-RS, BDD symptoms, and social anxiety symptoms (see Table 1).

Correlations between Measures

Correlations between all measures were estimated for boys and girls separately (see Table 1). Supporting Hypotheses 1 and 2, the independent variables of social anxiety symptoms and peer appearance teasing and the mediator, appearance-RS, were positively associated with BDD symptoms. Also, the independent variables were positively associated with the mediator. Peer-reported general victimization was not significantly associated with BDD symptoms or appearance-RS. In boys, social anxiety, self-reported appearance teasing, and peer-reported victimization were positively interrelated. In girls, social anxiety was positively associated with self-reported

appearance teasing, but not peer-reported victimization. Self-reported and peer-reported victimization were not associated in girls.

Model 1: Appearance Teasing, General Victimization, Social Anxiety and BDD, via Appearance-RS.

Model 1 was estimated to test the hypothesized indirect associations of self-reported appearance teasing by peers, peer-reported general victimization, and social anxiety symptoms with BDD symptoms, via appearance-RS (Hypothesis 1).

The model was saturated and fit statistics were not available. Table 2 presents bootstrapped estimates of paths, standard errors and confidence intervals. Figure 1 illustrates the significant paths, and presents the standardized bootstrapped coefficients and standard errors. The model explained 57% of the variance in BDD symptoms. There were significant direct paths from social anxiety ($\beta = .45, p < .01$) and self-reported peer appearance teasing ($\beta = .37, p < .01$) to appearance-RS, and from appearance-RS to BDD symptoms ($\beta = .33, p < .01$). Significant direct pathways were identified from social anxiety ($\beta = .38, p < .01$) and peer appearance teasing ($\beta = .19, p = .001$) to BDD symptoms, as well as indirect pathways from social anxiety ($\beta = .15, p = .01$) and peer appearance teasing ($\beta = .12, p = .01$) to BDD symptoms, via appearance-RS. There was no association between peer-reported general victimization and BDD symptoms ($p = .64$), or with appearance-RS ($p = .45$). Self-reported appearance teasing was positively correlated with social anxiety ($r = .42, p < .01$), however peer-reported general victimization was not associated with self-reported appearance teasing or social anxiety ($ps > .05$). Overall, 28% of the total effect of social anxiety symptoms on BDD symptoms ($\beta = .53$) occurred indirectly via appearance-RS. For self-reported appearance teasing by peers, 39% of the total effect ($\beta = .31$) on BDD symptoms was indirect.

Model 2: Appearance Teasing by Same-sex and Cross-sex Peers

Model 2 was estimated to test the hypothesized indirect associations of self-reported appearance teasing from same-sex and cross-sex peers, and social anxiety symptoms, with BDD symptoms, via appearance-RS (Hypothesis 2). Bootstrapped estimates of paths, standard errors and confidence intervals are reported. Multiple group SEM was employed to test gender and age differences.

Since all paths were freed and were significant, the model was saturated and fit statistics were not available. Table 3 presents the paths estimates, standard errors and confidence intervals. Figure 2 illustrates the significant paths, and presents the standardized bootstrapped coefficients and standard errors. The model explained 62.5% of the variance in BDD symptoms. There were significant direct paths from social anxiety symptoms ($\beta = .39, p < .01$) and cross-sex peer teasing ($\beta = .41, p < .01$), but not from same-sex peer teasing ($\beta = .06, p = .57$) to appearance-RS, and from appearance-RS to BDD symptoms ($\beta = .30, p < .01$). Social anxiety symptoms also demonstrated a direct pathway to BDD symptoms ($\beta = .43, p = .01$). Significant indirect pathways were identified from social anxiety ($\beta = .12, p = .01$) and cross-sex peer teasing ($\beta = .12, p = .01$), but not same-sex peer teasing ($\beta = .02, p = .60$), to BDD symptoms, via appearance-RS. Social anxiety was positively associated with same-sex ($r = .41, p < .01$) and cross-sex teasing ($r = .44, p < .01$), of which were strongly inter-related ($r = .86, p < .01$). Overall, 22% of the total effect of social anxiety symptoms on BDD symptoms ($\beta = .55$) occurred indirectly via appearance-RS. For cross-sex peer teasing, 59% of the total effect ($\beta = .21$) on BDD symptoms was indirect.

Gender and Age

The final aim of the present study was to test gender and age differences in Model 2 pathways (Hypothesis 3). There was no significant difference between the unconstrained and the constrained models according to gender (χ^2 difference (7) = 9.93, $p < .05$), suggesting that the model fit did not differ between boys and girls. On the other hand, three paths, when unconstrained

between age groups (10, 11, 12 and 13 years) compared to a model with all paths constrained to equality, was found to significantly improve the model fit. Specifically, the path from appearance-RS to BDD symptoms was not significant in 10 year olds ($\beta = .05, p = .66$), but was significant in 11, 12 and 13 years olds ($\beta = .46, p = .01$; $\beta = .36, p = .01$; $\beta = .56, p = .01$). Similarly, the path from social anxiety to BDD symptoms was not significant in the 10 year old group ($\beta = .17, p = .35$), but was significant in all older age groups ($\beta = .38, p = .01$; $\beta = .40, p = .01$; $\beta = .55, p = .01$). Finally, the path from cross-sex peer teasing to appearance-RS was not significant for the 10 or 12 year old age groups ($\beta = .49, p = .14$; $\beta = .26, p = .08$), but it was significant for the 11 and 13 year old age groups ($\beta = .57, p = .01$; $\beta = .52, p = .01$).

Discussion

The primary aim of this study was to examine whether BDD symptoms in early adolescent boys and girls were founded in appearance-related teasing and general victimization by peers. Additional aims were to examine the role of social anxiety symptoms in BDD, and to determine whether associations of peer adversity and social anxiety with BDD were at least partially explained by a social-perceptual bias referred to as appearance-RS. The importance of the source of peer appearance teasing (teasing by same-sex or cross-sex peers), and age and gender differences and moderation of these associations were also considered.

Most of the proposed hypotheses of this study were supported. In particular, as predicted, the results of structural equation modeling showed that BDD symptoms were higher in young adolescents who reported greater experiences of peer appearance teasing and who had heightened symptoms of social anxiety, and these associations were partially explained by elevated sensitivity to appearance-based rejection. Notably, however, when victimization was general (not appearance-specific) and reported by peers, it was not associated with BDD symptoms or appearance-RS. Taken together, these findings suggest that BDD symptoms may have foundations in peer adversity, and

such adversity is linked to BDD via the emergence of an overperception of social information as rejection due to appearance, and a heightened negative emotional reaction to such social information. These findings are consistent with Lavell and colleagues (in press), who confirmed a similar model in university students, which linked self-reported appearance victimization and social anxiety to BDD symptoms via appearance-RS. The findings are also consistent with research that has demonstrated associations of BDD with other forms of social adversity and biased information processing in adults (Buhlmann et al., 2004; Buhlmann et al., 2006; Buhlmann et al., 2007), as well as studies showing positive associations between peer victimization and body dissatisfaction in young adolescents (Lunde et al., 2006; Paxton et al., 2006). Yet, our findings are the first to extend such associations to BDD symptoms in early adolescents, showing that similar processes may exist even in the earliest years of the second decade of life. This highlights the importance of early intervention focused on social adversity and cognitive processing of social information that can be implemented in the late primary or early middle school years.

Social Anxiety and BDD

Previous research asserts that BDD and social anxiety are distinct, yet overlapping, conditions, showing high comorbidity, and sharing similar features, cognitive biases, age of onset, and illness trajectories (Fang & Hofmann, 2010). Accordingly, the present study found that social anxiety was positively associated with BDD symptoms in young adolescents, with this association being partially explained by higher appearance-RS. These findings support suggestions that social anxiety symptoms may pose a risk factor for the development of BDD (Fang & Hofmann, 2010), by confirming their association at a point that is temporally closer to the typical age of onset of BDD.

Teasing and BDD

Even after accounting for the association of social anxiety with BDD, it is notable that self-reported peer appearance teasing, but not peer-reported verbal and relational victimization, was

associated with BDD symptoms. There are a few potential explanations for this finding. First, victimization, especially verbal victimization, may be covert and undetected by peers, or deemed normal interpersonal banter, and thus not considered during the peer-norm process.

A second explanation is that these findings could be explained by the fact that self-reported teasing about appearance did not overlap with the verbal and relational victimization behaviors reported by peers (e.g., “Who do students often say mean things about behind their back?”). It may be that teasing relating to appearance in particular (especially when perpetrated by cross-sex peers), rather than verbal and relational victimization, is the important correlate of early adolescents’ BDD symptoms. Previous studies of adults have tended to focus on appearance-related adverse experiences as correlates of BDD (e.g., Lavell et al., in press; Osman et al., 2004). However, Buhlmann and colleagues (2007) did report that BDD sufferers retrospectively reported higher rates of both appearance- and competency-related teasing than healthy controls. Yet, it was appearance teasing that was associated with symptom severity in BDD participants.

Still a third explanation is cautiously posed; the discrepancy could provide some doubt about whether heightened perceptions of social adversity reflect actual experiences, or whether they instead reflect misinterpretation of social and emotional information. Notably, to our knowledge, all previous studies that have examined early adversity as a risk factor for BDD have relied on retrospective self-reports (e.g., Buhlmann, Marques, & Wilhelm, 2012). It is understandable that researchers have not previously obtained corroborating reports as subjective experience is often of most importance to understanding symptoms. However, if it were found that elevated subjective reports of teasing by peers reflect BDD sufferers’ misinterpretation or biased information processing, there would be important treatment implications, such as a need to focus on restructuring of interpretations versus processing of social experiences. It is important to note that this potential explanation requires further exploration. Self-reported appearance teasing specifically assesses the

perceived frequency and associated distress of peer appearance teasing, whereas the peer-norm process provides information on social reputation for a particular behavior, or whether a child's characteristics exceed norms for their environment (Ladd & Kochenderfer-Ladd, 2002), thus direct comparison of these self- and peer-report measures may not be appropriate. Moreover, shared method variance may have contributed to the association between self-reports of peer appearance teasing and BDD symptomology.

Overall, this discrepancy in our findings when comparing the associations of BDD symptoms with peer-reported general victimization versus self-reported appearance teasing is an important avenue for future research, and has implications for both understanding the development of BDD, as well as informing what to address in psychoeducational programs or clinical treatment.

Appearance-RS as a Mediator

Associations of social anxiety and peer appearance teasing with BDD symptoms were found to occur partially via the tendency to anxiously expect and readily perceive appearance-based rejection. Lavell and colleagues (in press) similarly identified this mediator in their study of young adults, and proposed that individuals who experience appearance-related victimization, and who report heightened fears of negative evaluation (i.e., social anxiety symptoms), may develop a social-perceptual bias towards expecting and perceiving signs of appearance-related rejection, leading to increasing concerns about their appearance and engagement in behaviors to prevent further perceived rejection, such as social avoidance, and excessive grooming and appearance checking (Buhlmann et al., 2011; Zimmer-Gembeck & Nesdale, 2013). Thus, these findings suggest that the biased processing of social information regarding rejection, and attributing such rejection to appearance deficits, seem to play crucial roles in the processes underlying why appearance teasing and social anxiety are manifested as BDD symptoms. Such findings point to the need to address the social concerns and the social information processing biases of young people, as well as their

concerns about their appearance, in any intervention to reduce BDD symptoms or other related body image disorders.

Boys Compared to Girls

Previous research has begun to consider how the gender of the aggressor or bully is important for understanding the impact on symptoms (Felix & McMahon, 2006; O'Brien, 2011). The present study did not isolate the gender of the perpetrator, but instead focused on whether the perpetrator and victim were the same-sex or opposite-sex. Specifically, when perceived appearance teasing from cross-sex and same-sex peers were considered simultaneously, it was cross-sex teasing, rather than same-sex, that was associated with elevated BDD symptoms. To our knowledge, this was the first study to consider the source of perceived teasing about appearance in association with BDD, and suggests that in an early adolescent sample, perceived teasing about appearance by cross-sex peers is particularly important. This period of development is known for increasing intimacy with friends and peers, and the formation of relationships with the opposite sex (Collins, Welsh, & Furman, 2009; Zimmer-Gembeck, 2002). As such, young people may have greater difficulty interpreting and understanding these more novel interactions with the other sex, making them susceptible to misinterpretation. Moreover, at a time when interest and involvement in romantic relationships is burgeoning (Collins et al., 2009; Zimmer-Gembeck, 2002), and increased value is placed on the opinions of cross-sex peers, appearance teasing by them may be particularly salient. It is notable that sexual orientation might have an impact on the salience and nature of interactions with same-sex and cross-sex peers - an avenue requiring research attention.

It is also possible that the nature of cross-sex teasing may differ from that of same-sex peers. It is likely that teasing from same-sex versus cross-sex peers would focus on different body parts or issues, and cross-sex peer teasing may be (or at least be perceived to be) of a sexual nature. In summary, these findings highlight the need for further research that more closely examines the

source and nature of adverse social experiences related to appearance, including details of the content of teasing, the target of the teasing (e.g., about body parts or about general body shape), whether the teasing is chronic or more intermittent, and the location of the teasing and whether it is done in the presence of others.

Despite some gender differences in the levels of some variables (e.g., BDD symptoms and appearance-RS were significantly higher in girls than boys), there was no evidence for gender differences in the associations between measures, as the model fit comparisons did not suggest that any model path differed between boys and girls. Whereas previous research has examined gender differences in levels of BDD symptomology and comorbidities, we found no studies examining gender differences in associations between BDD and other important correlates (i.e., gender moderation). This is perhaps due to the infancy of the field and the tendency for small sample sizes, and even smaller numbers of men or boys as participants, particularly when focusing on clinically diagnosed BDD (e.g., Buhlmann et al., 2012).

Age Moderation

In contrast to the findings of no differences between boys and girls, a few differences in associations between variables were found when comparing age groups (10, 11, 12 and 13 years). First, the pathway from social anxiety to BDD symptoms, and the pathway from appearance-RS to BDD symptoms were not significant in the youngest age group (10 year olds), but were significant in 11, 12 and 13 year olds. It may be that our assessment of children between ages 10 and 13 years has captured the point at which social concerns translate into signs of psychopathology. That is, the social concerns, victimization, and affiliative selectivity that emerges during childhood (Gifford-Smith & Brownell, 2003; Tremblay, 2000), may develop into BDD symptomology from around 11 years of age.

Another difference between age groups was also found, but was less clear. The pathway from cross-sex peer appearance teasing to appearance-RS was not significant in 10 or 12 year olds, but was significant in 11 and 13 year olds. Cross-sex relationships have been noted as an important correlate of adjustment in early adolescence (Collins, 2003; Zimmer-Gembeck, 2002), and cross-sex friendships have been found to attenuate associations between appearance-RS and psychological maladjustment in early adolescents (Bowker et al., 2013). Thus, it may be that during early adolescence cross-sex interactions are becoming more salient and desired, and concerns about social acceptance and one's appearance peak, yet consistent unfolding of interrelationships between these constructs is not yet clear. Finally, pubertal development may also be an important consideration in relation to associations between age, teasing, and appearance-RS, as research shows that increasing appearance concerns and peer victimization can accompany pubertal changes (Compian, Gowen, & Hayward, 2009; Haynie & Piquero, 2006).

Limitations and Future Directions

The size and survey-based design of the present study precluded use of validated structured (e.g., Structured Clinical Interview for DSM-IV; First, Spitzer, Gibbon, & Williams, 1995) or semi-structured interviews (e.g., BDD-Yale Brown Obsessive Compulsive Scale; Phillips et al., 1997) to assess BDD. Thus, the strength of our assessment is limited by the validity of the measure we employed, the Appearance Anxiety Inventory, which has demonstrated preliminary validity for the measurement of BDD symptoms (Veale, 2014). The cross sectional design of the present study prevents us from determining whether social adversity leads to BDD symptomology, or whether BDD symptomology influences retrospective interpretations of social experiences. Prospective research employing multiple reporters of social adversity would provide valuable information as to the developmental foundations of BDD symptoms. Additionally, the peer-reported victimization measure used in this study was based on only two items, potentially reducing the ability of the

measure to detect suitable diversity in victimization experiences. Finally, the response rate of this study was low (42.4%), and the age range of participants was restricted to between 10 and 13 years, potentially limiting the generalizability of results.

The present research poses many questions for future research. It is clear that further research is needed to more closely examine the social adversity and interpretative biases associated with BDD symptoms. Longitudinal research is needed that examines the specifics about the perpetrator (e.g., gender, social status) and content (e.g., appearance, sexually-based) of victimization experiences, and the interpretation of and meaning applied to perceived victimization. Moreover, the continued use of multiple-reporters is recommended.

Conclusion

In this first study of BDD symptoms in a group of young adolescents, social anxiety and perceived appearance teasing, especially by cross-sex peers, were associated with girls' and boys' reports of elevated BDD symptoms. Moreover, these associations occurred partially via the tendency to anxiously expect and readily perceive appearance-based rejection. These findings highlight the need for continued research to identify the social experiences and interpretative biases that contribute to BDD symptomology.

Conflict of Interest

The authors have no conflict of interest to declare.

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Figure 1. Significant Model 1 paths predicting BDD symptoms from appearance and general teasing, and social anxiety

Note. Standardized bootstrapped coefficients, with standard errors in parentheses, are shown here (and see Table 2)

Figure 2. Significant Model 2 paths predicting BDD symptoms from same-sex and cross-sex appearance teasing and social anxiety

Note. Standardized bootstrapped coefficients, with standard errors in parentheses, are shown here (and see Table 3)

Table 1

Means, Standard Deviations, Sex Comparison, and Correlations Between All Variables for Boys (n = 85) and Girls (n = 103)

	1	2	3	4	5	6	7
Correlations, boys above diagonal; girls below diagonal							
1. BDD symptoms	-	.50**	.34**	.35**	.41**	.11	.57**
2. Social anxiety	.70**	-	.22*	.18	.25*	.33**	.50**
3. Peer appearance teasing	.62**	.51**	-	.94**	.96**	.24*	.47**
4. Cross-sex peer appearance teasing	.61**	.54**	.94**	-	.87**	.16	.48**
5. Same-sex peer appearance teasing	.68**	.55**	.94**	.91**	-	.23*	.51**
6. Peer-reported general victimization	.66**	.62**	.04	.04	.06	-	.17
7. Appearance-RS	.13	.36**	.60**	.67**	.66**	.02	-
Boys, <i>M</i>	6.60	2.12	4.96	2.20	2.73	0.04	8.70
Boys, <i>SD</i>	5.40	0.71	8.59	2.12	3.50	0.97	5.57
Girls, <i>M</i>	11.05	2.47	6.06	2.92	2.72	-0.03	12.72
Girls, <i>SD</i>	8.45	0.87	11.50	3.52	3.23	1.06	8.24
Sex comparison, <i>t</i> (186)	4.30**	3.14**	-0.51	1.70	0.05	-0.51	3.79**

Note. BDD = Body dysmorphic disorder.

p* < .05. *p* < .01.

Table 2

Model 1 Estimates: Appearance Teasing, General Victimization, Social Anxiety and BDD, via Appearance-RS

Model paths	Unstandardized				Standardized			
	Path		Lower		Upper		Path	
	Estimate	SE	p	95% CI	95% CI		Estimate	SE
Direct effects								
Social anxiety → BDD*	3.47	0.65	.01	2.18	4.79		.38	.07
Peer appearance teasing → BDD*	0.14	0.06	.04	0.01	0.30		.19	.08
General peer victimization → BDD	0.17	0.52	.61	-1.19	1.07		.02	.07
Appearance-RS → BDD*	0.34	0.09	.01	0.15	0.52		.33	.08
Social anxiety → Appearance-RS*	4.11	0.73	.01	2.55	5.37		.45	.07
Peer appearance teasing → Appearance-RS*	0.27	0.09	.01	0.16	0.51		.37	.07
General victimization → Appearance-RS	-0.30	0.44	.50	-1.40	0.47		-.04	.06
Indirect effects via appearance-RS								
Social anxiety → BDD*	1.40	0.49	.01	0.43	2.38		.15	.05
Peer appearance teasing → BDD*	0.09	0.04	.01	0.04	0.18		.12	.04
General peer victimization → BDD	-0.10	0.15	.50	-0.45	0.14		-.01	.02

Note. BDD = Body dysmorphic disorder symptoms. CI = Confidence Interval. SE = Standard Error.

* $p < .05$. ** $p < .01$.

Table 3

Model 2 Estimates: Appearance Teasing by Same-sex and Cross-sex Peers, Social Anxiety and BDD Symptoms, Via Appearance-RS

Model paths	Unstandardized				Standardized				
	Path	SE	p	Lower		Path	Upper		
				Estimate	95% CI		Estimate	95% CI	
Direct effects									
Social anxiety → BDD*	0.37	0.06	.01	0.25	0.51	.40	.07	.27	.55
Cross-sex peer teasing → BDD*	0.01	0.05	.88	-0.09	0.11	.03	.20	-.34	.41
Same-sex peer teasing → BDD	0.04	0.05	.40	-0.05	0.13	.16	.18	-.22	.48
Appearance-RS → BDD*	0.03	0.01	.01	0.01	0.05	.30	.08	.14	.46
Social anxiety → Appearance-RS*	3.47	0.67	.01	2.08	5.06	.39	.07	.24	.54
Cross-sex peer teasing → Appearance-RS*	1.01	0.35	.01	0.34	1.74	.41	.14	.15	.72
Same-sex peer teasing → Appearance-RS	0.13	0.34	.82	-0.61	0.74	.06	.15	-.26	.32
Indirect effects via appearance-RS									
Social anxiety → BDD*	0.11	0.04	.01	0.04	0.20	.12	.04	.05	.21
Cross-sex peer teasing → BDD*	0.03	0.02	.01	0.01	0.08	.12	.06	.04	.27
Same-sex peer teasing → BDD*	0.01	0.01	.82	-0.02	0.02	.02	.05	-.09	.09

Note. BDD = Body dysmorphic disorder symptoms. CI = Confidence Interval. SE = Standard Error.

**p* < .05.