

Who Is the Fairest One of All? How Evolution Guides Peer and Media Influences on Female Body Dissatisfaction

Christopher J. Ferguson
Texas A&M International University

Benjamin Winegard
University of Missouri

Bo M. Winegard
Grand Valley State University

Much attention has focused on the influence of media images of thin women on body dissatisfaction among female viewers. Disagreement exists regarding the nature of media influences, with meta-analytic results suggesting only small effect sizes. Fewer researchers have focused on the role of peer influences and peer competition on female body dissatisfaction. Furthermore, the relation between body dissatisfaction and eating disorders may be more complex than is often implied in the media effects literature. Links between body dissatisfaction and eating disorders may be overstated, and some eating disorders, primarily anorexia nervosa, may not always be motivated primarily by body dissatisfaction. The current paper discusses these issues from an evolutionary perspective, examining how sociocultural forces influence the intensity of female competition and how such competition effects body dissatisfaction.

Keywords: body dissatisfaction, eating disorders, mass media, mate selection, female sexuality

Body dissatisfaction, particularly among women, has caused concern among scientists and policymakers for several decades. In Western societies, approximately 40%–50% of women express some level of body dissatisfaction. (e.g., Bearman, Presnell, & Martinez, 2006; Monteath & McCabe, 1997). Some researchers contend that this dissatisfaction may be an important factor in the onset of eating disorders and therefore that body dissatisfaction is a dangerous and potentially debilitating psychological phenomenon (Stice & Shaw, 2002). Media images of “ideal” women who are unnaturally thin have been targeted by researchers as a possible cause or contributing factor of widespread body dissatisfaction. For instance, in 2007, the American Psychological Association released a report on the “sexualization” of girls that extensively discussed the negative influence of the media on girls’ body dissatisfaction and concluded that the media play a prominent role in the development of body dissatisfaction. Although researchers have acknowledged that peers may also affect body dissatisfaction, (Shroff & Thompson, 2006), the preponderance of mainstream body image literature remains focused on the media (a quick “subject” search of PsychInfo using the terms *body image* and *media* returned 301 hits, whereas a search using *body image* and *peers* returned 144 and *body image* and *family* returned 161).

In this review, we examine the evidence for media and peer influences on female body dissatisfaction and the hypothesized

relation between body dissatisfaction and eating disorders. Regarding eating disorders, we focus specifically on anorexia nervosa (AN) and bulimia nervosa (BN). In the first section, we critically review contemporary psychology’s focus on the media as a primary source of body dissatisfaction. In the second, we turn our attention to eating disorders, specifically focusing on secular trends in AN and BN as well as their cross-cultural prevalence. Evidence that these disorders are not “culturally bound” and that they are not increasing dramatically leads us to view skeptically claims that media are an important cause of eating disorders. The third section considers the evidence that peer influences are an important factor in causing body dissatisfaction in women. We consider it valuable to contrast both the evidence and relative focus of psychology on peer and media influences. In the fourth section we move from the research on body dissatisfaction and eating disorders to providing a theoretical explanation of these findings. We do so by briefly reviewing sexual selection theory as it pertains to female intra- and intersexual competition. In the last section, we present a preliminary model that integrates the previous literature reviewed and attempts to explain the complex relationship between media, peers, body dissatisfaction, and eating disorders. Our specific focus is on putative social factors that have intensified the implicit and explicit levels of competition between women and how these may influence body image concerns.

Understanding Media Effects Theory

The American Psychological Association (2007) and scholars (Harrison & Cantor, 1997) have argued that exposure to thin ideals in the media are an important contributor to body dissatisfaction and eating disorders in women. There are several excellent reviews from socialization effects scholars that discuss the influence of the media and other socialization processes on body dissatisfaction and disordered eating (Becker, Keel, Anderson-Fye, & Thomas,

Christopher J. Ferguson, Department of Behavioral Sciences, Texas A&M International University; Benjamin Winegard, Department of Psychological Sciences, The University of Missouri; Bo M. Winegard, Grand Valley State University.

We thank David Geary for comments on an early draft of this article.

Correspondence concerning this article should be addressed to Christopher J. Ferguson, Department of Behavioral Sciences, Texas A&M International University, 5201 University Boulevard, Laredo, TX 78041. E-mail: CJFerguson1111@aol.com

2004; Fredrickson & Roberts, 1997; Levine & Murnen, 2009; Thompson & Stice, 2001). Put succinctly, media exposure is considered one of many factors (including peers, family, and genetics) that contribute to the internalization of thin ideals.

As such, we are careful to note that media effects scholars do not view media effects in a vacuum, but rather as part of a constellation of socialization influences including peers and families. Some scholars may approach the issue from a traditional socialization view (Fredrickson & Roberts, 1997), whereas others note the contribution of genetics (Becker et al., 2004). Thus media effects theory is not mutually exclusive with acknowledgment either of peer influences or of genetic influences. Our concern is not so much that media effects theory is inherently in conflict with these influences, but rather that the influence and importance of media effects has been exaggerated.

Numerous studies—utilizing experimental, correlational, and longitudinal, prospective methodology—have investigated media influences on body dissatisfaction. One recent review estimated that over 100 such studies exist (Grabe, Ward, & Hyde, 2008). Whether these studies provide evidence for clinical concern has been an issue of debate. For instance, Grabe et al. (2008) suggested that although some inconsistencies in the research exist, the overall evidence provides support for a robust link between media consumption and body dissatisfaction. However, other scholars have concluded that the current evidence is at best equivocal and that if such a link exists, it is neither simple nor obvious (Holmstrom, 2004; Joshi, Herman, & Polivy, 2004; Polivy & Herman, 2002).

There is no question that a number of experimental and correlational studies do find evidence for at least small effects of media use on body dissatisfaction (e.g., Birkeland, Thompson, & Herbozo, 2005; Bissell & Zhou, 2004; Halliwell & Dittmar, 2004). However, other studies, though fewer in number,¹ have found null effects (e.g., Ferguson, Munoz, Contreras, & Velasquez, in press; Martin & Kennedy, 1993; Thornton & Maurice, 1997) or that the presentation of media ideals may actually decrease body dissatisfaction (e.g., Cusumano & Thompson, 1997). Still others suggest that media influences have an impact only on women with underlying vulnerabilities such as neuroticism, unrestrained eating, or preexisting body dissatisfaction (e.g., Dalley, Buunk, & Umit, 2009; Joshi et al., 2004; Heinberg & Thompson, 1995). Trampe, Stapel, and Siero (2007) found that women who were already body-dissatisfied were more influenced not only by media ideals of female beauty, but also by thin vases. Other research has indicated that response to media ideals is variable, with some women decreasing, but others increasing, body satisfaction (e.g., Durkin & Paxton, 2002). Although relatively few in number, existing prospective studies provide mixed evidence that the media plays a long-term role in body dissatisfaction once proper statistical controls are applied (Clark & Tiggemann, 2008; McCabe & Ricciardelli, 2005; Presnell, Bearman, & Stice, 2004; Tiggemann, 2006).

Several meta-analyses have examined this research field to look for overall effects between studies. The first of these (Groesz, Levine, & Murnen, 2002) found an overall effect size of $r = .15$ between media exposure and body dissatisfaction. However, studies that presented more media examples, such as longer film clips or a greater number of thin models in magazine advertisements, tended to produce lower effect sizes. In other words, greater amounts of exposure to thin ideal models resulted in lower effect

sizes. Holmstrom (2004) estimated a lower overall effect size ($r = .08$) and also noted that longer exposure times tended to produce smaller effects. Holmstrom (2004) was unequivocal in her skepticism of the influence of the media on body dissatisfaction, stating that “. . . it appears that viewing thin images has an effect which is similar to viewing images of homes and gardens—none” (p. 210). More recently, Grabe et al. (2008) found an overall effect size of $r = .14$ and Want (2009) found a similar effect size ($r = .17$). Importantly, the meta-analysis conducted by Grabe et al. (2008) showed evidence of publication bias, with published data having significantly larger effect sizes than do unpublished data. Their Table 5 (p. 470) seems to suggest the opposite, that unpublished studies have larger effects than do published studies. However, this appears to be a misprint. We reran their meta-analysis with the data provided by Grabe et al. (2008) in their Table 1 and found that generally speaking, as is typical, unpublished studies had weaker effects than did published studies.² That Table 5 was misprinted was further confirmed by the first author of the original meta-analysis (S. Grabe, personal communication, April 2010). The other meta-analyses conducted no formal tests of publication bias.

From these analyses we can reasonably assert that the effect size for media exposure on body dissatisfaction is $r = .08$ to $.17$. Such effects are small (Cohen, 1992) and are below the $r = .2$ cutoff for practical significance suggested by some researchers (e.g., Ferguson, 2009; Franzblau, 1958; Lipsey, 1998).

A reasonable argument contends that the small effects found in experimental studies can be explained by media saturation. According to this argument, because the subjects in these experiments are exposed to media on a daily basis, there is a “ceiling effect.” In other words, the media have already produced whatever effects it could potentially produce. However, this argument is weakened by the equally small effects found in correlational research, which cannot be explained by a ceiling effect. Because correlational studies measure relative frequency and quantity of media consumption between individuals, media saturation is less of an issue. These correlational studies find that the variance in media consumption has less than 3% overlap with the variance in body dissatisfaction. The amount of variance accounted for by the correlational studies might be even lower because these studies often do not control well for potential confounding variables. As such, variance in one variable essentially cannot predict variance in the other. Furthermore, demand characteristics may actually inflate the true effect size of experimental studies. Thus, although

¹ We note that it is not possible to conclude that fewer published null studies indicate fewer null effects across all studies. Given that journals generally prefer to publish significant effects rather than null effects, it is possible that the relatively fewer number of published null effects may be due to publication bias. This possibility is supported by the results of Grabe and Hyde (2008), which found evidence for publication bias effects in the media/body dissatisfaction literature.

² When we first reran the Grabe et al. (2008) meta-analysis, we found that the effect sizes between published and unpublished studies were about equal. However, one outlier dissertation (Strahan, 2003) has much higher effects reported than do all other dissertations, skewing the meta-analytic results. With this study removed, the effect sizes for unpublished studies (approximately $r = .12$) were smaller than that for published studies (approximately $r = .17$).

we are aware of such arguments, we are confident in asserting that media effects are very small.

Although the direct effects of media exposure on body dissatisfaction are small, some research has indicated that *awareness* and *attention to thin ideals* are associated with body dissatisfaction (Smolak, Levine, & Thompson, 2001; Thompson, van den Berg, Roehrig, Guarda, & Heinberg, 2004). However, it is important to note that the measures used in these studies, such as the Sociocultural Attitudes Toward Appearance Questionnaire (SATAQ-3), do not measure direct exposure to media, but rather an individual's proclivity to pay attention to such media and to compare themselves to it (e.g., "I've felt pressure from TV or magazines to lose weight"; Thompson et al., 2004) in addition to other social messages (e.g., "I compare my body to that of people in good shape"). In other words, this line of research, though certainly important, examines an internal variable (proclivity to compare oneself to others) rather than an external exposure variable (e.g., quantity or frequency of media images consumed). Thus, although we feel that this is an important and intriguing line of research, it does not bear directly upon media exposure.

Eating Disorders, Body Dissatisfaction, and the Media

The *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., text rev.; *DSM-IV-TR*; American Psychiatric Association, 2000) divides eating disorders into three main categories: anorexia nervosa, bulimia nervosa, and eating disorder NOS ("not otherwise specified"). The key symptom of AN is the purposeful maintenance of weight at 20% or below the minimum ideal weight range, and the key symptom of BN is a pattern of binge eating with perceived loss of control and subsequent purging motivated by weight concerns (American Psychiatric Association, 2000). Although there is disagreement about the validity of the *DSM-IV*'s classification and diagnosis of eating disorders (Wonderlich, Joiner, Keel, Williamson, & Crosby, 2007), especially the NOS category (Fairburn & Bohn, 2004), there is a good deal of evidence—genetic, etiological, and demographic—supporting a distinction between AN and other forms of disordered eating, including BN (Gorwood, Kipman, & Foulon, 2003; Keel & Klump, 2003; Klump, Miller, Keel, McGue, & Iacono, 2001). We contend that this is not only a real distinction but a vitally important one. It is quite possible, for example, that anorexia is strongly influenced by genetics, with the environment playing only a limited role in onset, whereas other eating disorders are more influenced by environmental factors. We discuss this issue in depth below.

Many researchers have argued that AN, BN, and other eating disorders are caused by body dissatisfaction issues that are "culturally bound" (Becker, Burwell, Gilman, Herzog, & Hamburg, 2002; Keel & Klump, 2003; Prince, 1985). According to Sumathipala, Sirribaddana, and Bhugra (2004), "[c]ulture-bound syndrome is a term used to describe the uniqueness of some syndromes in specific cultures" (p. 200). Becker (1995, 2005; Becker et al., 2002), for example, argued that there are no indigenous Fijian concepts that correspond to the classifications used in the *DSM-IV* and that cases of AN and BN were "rare or nonexistent" (Becker, 2005, p. 538) among ethnic Fijians before the 1990s. She further argued that the few Fijian terms that do describe disordered eating have no "nosological correlate(s)" (Becker, 2005, p. 538) in the West. However, a number of scholars have discovered that AN

is highly heritable (Bulik et al., 2007; Klump et al., 2001; Gorwood et al., 2003), and other scholars (for a review, see Keel & Klump, 2003) have discovered cases of AN in diverse non-Western countries, including Nigeria, Zimbabwe, Egypt, United Arab Emirates, Iran, China, Japan, Korea, Russia, India, Pakistan, and Malaysia, some with little or no exposure to Western media (Soh, Touyz, & Surgenor, 2006). In fact, a recent review of research using the Eating Disorders Inventory (EDI and EDI-2) found that non-Western participants scored higher on most of the subscales than did Western participants; the review also noted that the factor structure of the EDI was similar across cultures, implying measurement invariance (Podar & Allik, 2009). Another important study examined eating disorder symptom rates among Iranian women living in America and Iranian women living in Iran and found little difference between them (Abdollahi & Mann, 2001). This is important because Iran has banned Western media since 1979 and requires women to cover their bodies with long veils or overcoats.

Although AN was first "discovered" and described in modern terms by Ernest Charles Lasègue and William Withey Gull in 1873, there are many documented cases of disorders that appear similar to AN beginning in late antiquity (Brumberg, 2000; Vandereycken & van Deth, 1994). Although a high degree of caution is necessary when interpreting historically documented self-starvation, cases such as that of Catherine of Siena are very suggestive. Catherine was born in 1347 in Siena, Italy. She is described as living an austere life, eating almost nothing. Much of what she did eat, she seems to have regurgitated. She died of malnutrition at the age of 32 (Bemporad, 1996). Bell (1985) identified over a hundred such cases of self-starvation between 1200 and 1600 A.D. Consistent with the idea that AN is not a new phenomenon, Parry-Jones' (1985) archival study of asylums and hospitals in the 19th century found 40 cases suggestive of AN. This in combination with the cross-cultural research described above allows us to conclude that AN exists across temporal and spatial bounds. Furthermore, these cases suggest that the link between fears of not obtaining a "thin ideal" and developing clinical eating disorders is more complex than some researchers allow. For instance, in a recent study of young Hispanics (Ferguson, Munoz, et al., in press), women whose weight was within the healthiest range showed the lowest body dissatisfaction, lower than that for extremely thin women.

It is important to note that BN and other forms of disordered eating may be more influenced by environmental circumstances than is AN. Keel and Klump (2003), for example, noted that BN has shown trends of increasing prevalence through time in Western societies; however, they also noted that the underlying pathology that causes BN in modern society may have taken different forms at different historical periods and other researchers have demonstrated that BN has an important genetic component (Bulik, Sullivan, & Kendler, 1998; Parry-Jones & Parry-Jones, 1991). It is also important to note that Becker et al.'s (2002) widely cited study among the Fiji revealed no increase in AN following the introduction of Western media, although an increase in other forms of disordered eating was found. Becker studied disordered eating in two groups of Fijian women residing in the Nagroda province in 1995 and 1998. Prior to mid-1995, there was little access to TV in Nagroda; therefore, Becker's study seems to isolate the effects of TV on disordered eating. However, as Becker noted, the social

milieu of the province, impelled by a shift from a subsistence agriculture economy to a cash-based economy, was also undergoing rapid change, which causes increased stress and increased or novel forms of female intrasexual competition, both possible causes of disordered eating (Anderson-Fye & Becker, 2004; Kaye, 2008); therefore, it is problematic to conclude that media exposure was a causal factor related to increases in disordered eating.

In the West, rates of AN and BN have remained consistent or changed only slightly over time (Fombonne, 1995a, 1995b; Hoek, 2006; Keel, Heatherton, Dorner, Joiner, & Zalta, 2006; Pawluck & Gorey, 1998). It is difficult to make exact conclusions about the prevalence of AN and BN—a recent review of the literature by Hoek and van Hoeken (2003) estimates that the prevalence of anorexia among young women is roughly 0.3% and that the rate of bulimia is about 1%—so moderate differences in estimates across time should not be surprising (Fombonne, 1995a, 1995b; Keski-Rahkonen et al., 2007), particularly where screening efforts may have improved. Whatever the true prevalence of AN and BN, it is safe to conclude that neither disorder represents a new epidemic (P. Williams & King, 1987).

Furthermore, research on Westerners has shown that certain ethnic groups, particularly Caucasians, are at higher risk for developing AN, BN, and body dissatisfaction, even though African American women report higher levels of media exposure than do Caucasian women (Escobar-Chaves et al., 2005; Grabe & Hyde, 2006; Hoek, 2006; Hoek et al., 2005; D. F. Roberts, 2000). Looking across ethnic groups, Grabe and Hyde (2006) found that African Americans are particularly resilient to body dissatisfaction, with greater similarities among Caucasians, Asians, and Hispanics living in the United States. Some researchers have argued that the gap between African American and Caucasian women's body dissatisfaction is decreasing because of the increasing ubiquity of the "thin ideal" in the West (e.g., Striegel-Moore, Schreiber, Pike, Wilfley, & Rodin, 1995; Wilfley et al., 1996). This assertion, at least in its simplest form, is contradicted by a recent meta-analysis that found that the gap has been reduced only on measures specifically related to weight, but that the gap has actually diverged on measures related to more global body dissatisfaction (A. Roberts, Cash, Feingold, & Johnson, 2006). Similarly, homosexual men, but not lesbian or bisexual women, are at higher risk for eating disorders even though media ideals for hetero- and homosexual men are similar (Harvey & Robinson, 2003; Russell & Keel, 2003). In fact, homosexual men tend to emphasize upper body muscularity more so than do heterosexual men (Swami & Tovée, 2008). A possible mechanism for this difference may be in utero testosterone exposure. For instance, one study (Culbert, Breedlove, Burt, & Klump, 2008) found that girls who had opposite-sex twins (and thus were likely exposed to more testosterone in utero) had lower rates of eating disorders than did girls with same-sex twins. In support of this hypothesis, a meta-analytic review found that masculinity was negatively associated with eating pathology and body dissatisfaction (Blashill, in press).

Summary

The relationship among media exposure, body dissatisfaction, and disordered eating is complicated and requires a more sophisticated answer than just "yes/no there are causal effects." After examining the evidence, we are led to the following conclusions:

1. Although research does suggest a small relationship between media exposure and body dissatisfaction, the effect size does not yet reach the level of practical significance (e.g., Ferguson, 2009). Furthermore, the weak effect sizes do not provide convincing evidence for causal effects. As such, we agree with Levine and Murnen (2009) that media effects are best considered as a variable risk factor rather than a causal risk factor (Kraemer et al., 1997).
2. Most women are relatively unaffected by thin models presented in the media. Those women most likely to be negatively influenced by such images appear to have preexisting body dissatisfaction concerns or high neuroticism. Other women, particularly those with positive body image, may experience positive effects following media consumption.
3. Given the available data, popular and even scientific analyses of body dissatisfaction (e.g., American Psychological Association, 2007; Wolf, 2002) often overemphasize the causal power of the media.
4. There is not a clear relationship between body dissatisfaction and eating disorders, especially AN. Many people who are unhappy about their bodies never develop eating disorders, and many of the forms of disordered eating that they do develop are much less severe than is clinical AN. As is noted above, historical analysis has suggested that AN can and has developed in individuals for whom body dissatisfaction was not a primary concern.

There is little doubt, however, that many researchers and sufferers believe that the media are the primary cause of eating disorders and body dissatisfaction (e.g., Becker, 2005; Becker et al., 2002). This is not surprising, and there is no reason to doubt the sincerity of those who profess such beliefs. Research has shown that humans are often inaccurate at discerning the causes of their own behavior and that they resort to salient cultural narratives to help explain their own and others' behavior (Wilson, 2002; Wilson & Dunn, 2004). The theory of media exposure is appealing to many for several reasons. First, and most important, it is coherent. It provides an answer that is more understandable than esoteric claims about genetics, heritability, and diatheses. Second, it creates a clear "villain," one that has understandably dubious standing among many intellectuals (Chomsky & Herman, 1988; Miller, 2009). However compelling these reasons, it is important to understand the etiology of body dissatisfaction and eating disorders if we wish to discover better methods of intervention. As the above research demonstrated, these may be two separable questions. Unfortunately, the etiology of eating disorders remains problematic and there are lacunae in our knowledge that need to be remedied before the developmental pathology of eating disorders is clearly understood (Jacobi, Hayward, de Zwaan, Kraemer, & Agras, 2004; Polivy & Herman, 2002; Striegel-Moore & Cachelin, 2001). The same problems apply to body dissatisfaction about which, despite the proliferation of theories and papers, much remains unknown (Smolak, 2004; Soh et al., 2006).

Excessive focus on the dangers of the media may distract researchers and sufferers from other social factors that have arguably larger effects. For example, the influence of peers has been found to be one of the strongest and most consistent predictors of negative outcomes in other areas such as aggression, and controlling for peer influences in that realm tends to reduce media effects to nonsignificance (Ferguson, San Miguel, & Hartley, 2009).

Peer Influences on Female Body Dissatisfaction

Peers can influence female body dissatisfaction through two main routes. First, peers may actively influence women through verbal comments, communication of beauty norms, explicit verbal comparisons, and attributions of personal value based on beauty. Peers may also passively influence body dissatisfaction by provoking internal or unconscious body comparisons. Both of these socialization processes are driven by competition for mating resources (Geary, 2010).

Most of the extant research has focused on the active effects of peer influences. For instance, in an important study (Clark & Tiggeman, 2008), media exposure to thin models was found to have little direct influence on body dissatisfaction in preadolescent girls (bivariate r between media exposure and body esteem were only $-.08$ for magazines and $-.09$ for TV). By comparison, the influence of peers on body dissatisfaction was significant (bivariate $r = -.20$). A subsequent path analysis suggested that peers may act as a conduit for media effects. Other studies have also found active peer effects to be among the strongest influences on body dissatisfaction in young girls (Dohnt & Tiggemann, 2005; Taylor et al., 1998).

Research with adolescents similarly suggests that active peer influences are among the strongest influences on body dissatisfaction (Jones, Vigfusdottir, & Lee, 2004; Lindberg, Grabe, & Hyde, 2007; Paxton, Schutz, Wertheim, & Muir, 1999; Shroff & Thompson, 2004). For instance, in the path analysis conducted by Jones et al. (2004) media influences had no direct relationship with body dissatisfaction and only a weak, indirect relationship through internalization of thin ideals ($\beta = .13$). By contrast, direct effects for peer criticism ($\beta = .31$) and indirect effects for appearance conversations through internalization of thin ideals were far stronger ($\beta = .44$). Similarly, McCabe and Ricciardelli (2005) found that girls' body dissatisfaction was influenced by their mothers and female friends but not by media. A recent meta-analysis of appearance related teasing, body dissatisfaction, and disordered eating found an overall effect size of $r = .37$ between weight-related teasing and body dissatisfaction in girls and an effect size of $r = .33$ between appearance-related teasing and body dissatisfaction (Menzel et al., 2010). These effects are small to moderate but considerably larger (about three to five times larger with regard to explained variance) than are media effects using the highest $r = .17$ meta-analytic estimate.

Other studies have examined the influence of peer comparisons, or passive influences, on body dissatisfaction. This may be a particularly important area to consider given that the research suggests everyday social comparisons are made with peers rather than media figures (Wheeler & Miyake, 1992). For example, in a naturalistic experiment, (Wasilenko, Kulik, & Wanic, 2007), women in a gym who were randomly assigned to exercise near a physically fit confederate reported reduced body satisfaction and

less exercise time than did women who were randomized to exercise near a nonfit confederate. The effect size on body dissatisfaction was approximately $r = .31$ —small, but as with active peer influences, appreciably larger (about 3.33 times larger with regard to explained variance) than media effects. Ferguson, Munoz, et al. (in press) compared peer competition and TV influences in both an experimental study and a correlational study. TV influences were negligible, but women reported greater body dissatisfaction in the presence of attractive peers, particularly when a desirable man was present. Krones, Stice, Batres, and Orjada (2005) randomly assigned female undergraduates to interact with either a “thin ideal” confederate or an “average” confederate. The authors found that women exposed to a thin confederate displayed decreased body satisfaction in relation to those interacting with an average confederate, although the effect size was smaller (approximately $r = .18$) than that found by Jones (2001). Jones (2004) found that girls compared themselves with both same-sex peers and media models but that comparisons with peers extended to personal as well as physical characteristics and predicted body dissatisfaction longitudinally.

This research indicates that both active and passive peer effects are stronger influences on female body dissatisfaction than are the media. These findings can be illuminated using an evolutionary perspective. Female competition for men who possess putative indicators of good genes, status, or willingness to invest resources is one factor that has led to the evolution of prominent secondary sex characteristics (Thornhill & Gangestad, 2008). Numerous studies have shown that men use these characteristics to discriminate among potential mates (for examples, see Geary, 2010). Thus for women, physical appearance is an important component of reproductive success (Rhodes, Simmons, & Peters, 2005). Put another way, body dissatisfaction may have less to do with misplaced media ideals, and more to do with very real concerns about successfully finding mates.

From the literature reviewed to this point we conclude several points:

1. Genetic effects on both eating disorders and body dissatisfaction are clearly the strongest effects, accounting for approximately 40% to 80% of the variance (Bulik, Sullivan, & Kendler, 1998; Keski-Rahkonen et al., 2005; Klump et al., 2001; Spanos, Burt, & Klump, 2010; Wade, Wilkinson, & Ben-Tovim, 2003) in such outcomes.
2. Among social factors, peer influences, both active and passive, exert the most powerful influence on body dissatisfaction.
3. Media effects on body dissatisfaction remain generally small and inconsistent, particularly when other factors, such as peer influence, are controlled.

A full understanding of the effects of social comparisons on female body dissatisfaction requires an evolutionary lens. To date, however, little effort has been made to integrate the findings of social science, behavioral genetics, and evolutionary psychology into a comprehensive framework. Abed (1998) is a notable exception. His sexual competition hypothesis, which posited that West-

ern societies overactivate female mate maximizing strategies leading to an increase in eating disorders, attempted to integrate social and evolutionary theories. Although we make use of many aspects of his theory, we view it as a more plausible explanation of body image dissatisfaction than of eating disorders. In the following sections we propose a theoretical model for understanding body dissatisfaction from an evolutionary framework. We also address the relationship between body dissatisfaction and eating disorders more closely in the last section.

Evolutionary Value of Female Physical Attractiveness

For men, much more so than for women, reproduction is limited by access to mates with high residual reproductive values (D. M. Buss & Schmitt, 2003; Geary, 2000; Trivers, 1972). Thus women who display traits indicating health and fertility will be perceived as attractive to men (D. M. Buss, 2008; Symons, 1979). Because humans form pair-bonds that often include paternal investment—a fairly uncommon pattern in mammals—women should compete for access to men who display putative signs of good genes, status, and resource procuring potential. This competition has resulted in the evolution of permanent bodily ornaments in women (i.e., secondary sex characteristics) that display residual reproductive value (Etcoff, 1999; Gottschall, 2007; Thornhill & Gangestad, 2008).

Evidence for the prediction that men place greater emphasis on attractiveness than do women comes from many sources. For example, a study of historical folklore from 13 cultural areas by Gottschall et al. (2008) demonstrated that physical attractiveness was more often emphasized in female characters than in male characters. Two important cross-cultural studies, one consisting of 37 cultural regions (D. M. Buss, 1989), the other of 53 nations (Lippa, 2007), confirmed this preference across multiple cultural units.

Because youth is highly correlated with reproductive value in women, the most salient traits that men have evolved to be attuned to are those that indicate youth (Durante & Li, 2009; Law Smith et al., 2006). There are many potential indicators of female youth such as lustrous hair, clear and vibrant skin, vivid eyes, rounded breasts, low waist-to-hip ratio (WHR), and symmetry (D. M. Buss, 2008; Marlowe, 1999). Kenrick and Keefe (1992) tested the hypothesis that men are attracted to relatively young women by using self-report, personal ad, and marriage license data. Their study found that as men aged, they consistently preferred younger women in relation to their own age. Although a reasonable counterargument might be that men prefer mates that they can easily dominate, Kenrick, Keefe, Gabrielidis, and Cornelius (1996) demonstrated that young adolescent men actually prefer slightly older women (i.e., women with higher residual reproductive values than women their own age), suggesting that this counterargument is unlikely.

Even women of the same age possess differences in genetic and phenotypic quality to which men are sensitive. One such trait is bilateral symmetry, which is hypothesized to signal phenotypic condition and thus provide a cue to underlying genetic quality (Grammer & Thornhill, 1994; Grammer, Fink, Møller, & Thornhill, 2003). Consistent with this, Jasienska, Lipson, Ellison, Thune, and Ziomkiewicz (2006) found that symmetrical women have significantly higher amounts of estradiol at midcycle (peak fertility) than do asymmetrical women. These hormones lead to a

greater probability of conception. Another trait is having gynoid, as opposed to android, fat deposits. Gynoid fat deposits give rise to the stereotypical pear-shaped female body as well a relatively low WHR (Singh, 1993; Singh & Randall, 2007; Singh & Singh, 2006). Studies have shown that women possessing low WHR have better health, including lower risk of cardiovascular disease, depression, and anxiety disorders, than do women with larger WHR (Singh, 2006). Jasienska, Ziomkiewicz, Ellison, Lipson, and Thune (2004) found that women with narrow waists and relatively large breasts had higher levels of 17- β -oestradiol and progesterone, both hormones that facilitate ovulation, than did women with smaller breasts or larger waists. Finally, Lassek and Gaulin (2008) found that children of women with low WHRs had higher intelligence than did children of women with higher WHRs, possibly a result of the essential fatty acids found in gluteofemoral fat (i.e., fat deposits on the buttocks and thighs).

Although cross-cultural differences in female body preference certainly do exist, some similarities are noted across cultures. For instance, the low WHR, facial symmetry, youthful appearance, and enlarged and firm breasts show considerable consistency across cultures. However, cross-cultural variations do occur. For example, although the narrow WHR is preferred across cultures, the specific ratio varies from approximately 0.6 among Chinese men (Dixson, Dixson, Li, & Anderson, 2007) to approximately 0.8–0.9 in African American men (Freedman, Carter Sbrocco, & Gray, 2007); all groups appear to rate overweight women unattractive. Body preferences may also vary somewhat across time periods (Mazur, 1986). It is often observed that European Renaissance paintings of nude women featured higher WHR, although still fitting the general “hourglass” pattern. For example, the nude women painted by Rubens (17th century) had a mean WHR of .776 (Swami, Gray, & Furnham, 2006). By contrast, the images of nude women in more recent print media possess smaller WHRs and are thinner (Owen & Laurel-Seller, 2000). A study of *Playboy* magazine centerfolds from 1978 to 1998 revealed a mean WHR of .68. Notably, this ratio had not changed during the 20 years assessed by the study (Katzmaryk & Davis, 2001). Even greater variation may be seen in cultures in which food resources are scarce (Cashdan, 2008), and some cultures may appreciate female bodies that would be considered “obese” in Western cultures (Swami et al., 2010).³

Fn3

³ Although we speculate that a preference for a low WHR and moderate thinness in the West is related, it is important to note that WHR is not synonymous with body mass index (BMI)—a measure of weight scaled for height (in kilograms per meters squared) (Bray, 1998). In this paper, we make use of “thin,” because of this usage in the media effects literature (e.g., “drive for thinness”). There exists a healthy debate over which cue (or cues) are most important to men when assessing female attractiveness, with some authors (e.g., Singh & Randall, 2007) arguing for WHR and other authors (e.g., Tovée & Cornelissen, 2001; Cornelissen, Tovée, & Bateson, 2009) arguing for BMI. Recently, an argument has been made for abdominal depth and waist circumference (Rilling, Kaufman, Smith, Patel, & Worthman, 2009). Because of the ongoing nature of this debate and lack of space, we think it reasonable not to get overly concerned about these distinctions. Future research on body dissatisfaction and eating disorders may benefit by distinguishing clearly between women with optimal WHRs but low BMI and women with optimal BMI but low (or high) WHRs.

These cross-cultural differences in body preference are a source of controversy. The differences suggest that culture can have an influence on body dissatisfaction (a point we agree with). Although it remains speculative, one possibility is that these differences may be less driven by “top-down” socialization and instead reflect facultative shifts in response to ecological variables (Nettle, 2009b). Men are expected to prefer the WHR that indicates health in a given environment rather than a .7 WHR per se. For instance, during the Renaissance, food, for most individuals, was relatively scarce. Women with lower WHR and muscular bodies were more often from the peasant class and malnourished, hence possessed lower reproductive potential. By contrast, larger (but not overweight) women may have signaled reproductive value due to better diet (P. J. Brown & Konner, 1987). By contrast, in affluent societies in which obtaining a larger figure is easy (perhaps too much so), maintaining a trim athletic figure may become a better indicator of health. Supporting this hypothesis, a cross-cultural study across 62 cultures found that “plump” women are considered attractive in societies in which food supplies are unreliable (Anderson, Crawford, Nadeau, & Lindberg, 1992; but see Ember, Ember, Korotayev, & de Munck, 2005). Laboratory studies have also found that men who feel either hungry or poor prefer heavier women than do satiated or rich-feeling men (Nelson & Morrison, 2005; Swami & Tovée, 2006), although effect sizes from these studies tend to be very small and should be interpreted with caution.

Cross-cultural differences may also be understood through population genetics. Given that, historically, populations of humans living in disparate geographic regions (Asia vs. Africa vs. Northern Europe, say) were exposed to differential environmental pressures (climate, food availability, disease, etc.), it is expected that indices of female health and reproductive value will vary from culture to culture. Another possibility is that sexual selection acted to diversify the traits that humans prefer in separate geographical regions. For example, women of European descent tend to have narrower waists and wider hips than do women of other geographical origins (Frost, 2006). Thus, through differential selection pressures, men in one group may have adapted to prefer some elements of the female physique that are not preferred by other groups of men. Most cultures focus on similar traits (WHR, etc.), but the range of preferred values of these traits may differ across cultures. This may explain, for instance, why African American men generally prefer a higher WHR than do European American men (Freedman et al., 2007), despite arguably being exposed to very similar media and cultural influences while living in the United States.

The upshot of this is that female attractiveness is very important for both women and men. For women it is important because it is one of the key determinants of their mate value and of their ability to compete intra- and intersexually; for men, because it indicates the underlying reproductive value of the woman. This may explain why women's self-esteem is heavily correlated with their body image (Wade, 2000) and why female, but less so male, self-perceived attractiveness has affective and cognitive links to their bodies (Wade & Cooper, 1999). Although the evolutionary logic explicated above can go some way toward explaining why women are more susceptible to body dissatisfaction, there are also significant differences in the structure of male and female peer groups and the form that intrasexual competition takes, which may address the unshared environmental variance in body dissatisfaction and perhaps eating disorders.

Sexual Selection and Male and Female Competition

During the course of hominid evolution, men and women had to solve different problems associated with group living (Sanderson, 2001). Men have a long history of between-groups conflict, with high mortality rates among adults (Browne, 2007; Gat, 2006; Geary, 2010; Keegan, 1994; Keeley, 1996; LeBlanc & Register, 2003; Otterbein, 2004). Men have evolved to form within-group coalitions, which allow them to better exploit resources such as material goods, food, territory, and reproductively receptive women. However, coalitions diminish individual rewards through the need for sharing and cooperation (Benenson, Markovits, Thompson, & Wrangham, 2009). This has led men to suppress facets of in-group competition in favor of between-groups competition. This is not to say that men do not compete within groups, but rather that they arguably accept coalitional hierarchies, role differentiation, and specialization more so than do women (Geary, Byrd-Craven, Hoard, Vigil, & Numtee, 2003). Men then compete within such hierarchies for status and display signals of their achievements (Miller, 2000; Morris, 1999).

In distinction to male coalitional behavior in which hierarchies and conformity to leadership is emphasized (Morris, 1999), female peer relations more often take the form of dyadic relationships with an emphasis placed on reciprocity, emotional disclosure, and social support (for a review, see Rose & Rudolph, 2006). The importance of close dyadic relationships and nonhierarchical social networks, combined with the greater costs of physical aggression (Campbell, 1999), leads to less direct aggression in women than in men. Female intrasexual competition, instead, takes the form of manipulating social and romantic relationships, spreading slanderous gossip, using nonverbal cues, and ostracizing competitors from valued social groups (Archer & Coyne, 2005; Benenson, Hodgson, Heath, & Welch, 2008; Bjoerkqvist, 1994; Coyne, Archer, & Eslea, 2006; Feshbach, 1969; James & Owens, 2005; Oesterman et al., 1998). Such competitive aggression is indirect in that it often involves furtive behavior (A. H. Buss, 1961; Kaukianinen et al., 1999). It is also relational in that the purpose is to harm the victim through the manipulation of important social relationships (Crick, 1995). More important, this aggression is social and the goal is to damage the self-esteem, social relationships, and often the mate value of the victim.

Women's intrasexual competition increases negative affective states such as depression and anxiety and is often geared toward making the victims of such competition conscious of their bodies, particularly given the emphasis that men place on physical features in selecting mates. Women often compete by derogating same-sex competitors, especially focusing on physical appearance and sexual behavior (Baumeister & Twenge, 2002; D. M. Buss & Dedden, 1990; Joseph, 1985). These insults have real-life effects on women (Rucas et al., 2006). For example, Fisher and Cox (2009) found that when women insult the photographs of other women, men rate those photographs as being lower in attractiveness. Studies have also demonstrated that women feel high levels of distress when around attractive rivals or, often times, attractive women in general (D. M. Buss, Shackelford, Choe, Buunk, & Dijkstra, 2000; Luxen & Van De Vijver, 2006). Even women who perceive their same-sex friends as being more attractive than themselves report more rivalry in the friendship than do women with more equally

matched friends (Bleske-Rechek & Lighthall, 2010). The process of female competition often leads to invidious comparison and excessive rumination (Hill & Buss, 2006; Nolen-Hoeksema & Jackson, 2001). Furthermore, both men and women tend to overestimate the attractiveness of rivals (Hill, 2007), which compounds the effects of intrasexual competition.

The female–female competition discussed above can be a potent force in drawing women’s attention to their perceived bodily shortcomings (Wade, 2000) and increasing their body dissatisfaction. However, there are myriad factors in modern industrial societies that exacerbate these female competitive processes. We document these factors below and hypothesize that if there are increases in body dissatisfaction and eating disorders, these factors, rather than media-driven effects, are largely to blame. Space does not permit us to detail every factor; however, we would like to impel further research and hypothesis testing, and therefore briefly address what we believe are the most important factors exacerbating female intrasexual competition. The following are hypotheses that could be tested.

Relative Affluence Increases Body Dissatisfaction

As we have previously noted, in societies in which food supply is steady and abundant, men tend to prefer lower WHR women than in do men in societies with food scarcity (Anderson et al., 1992). This in itself could lead to a drive for lower WHR in women. However, affluent societies may influence body dissatisfaction in more nuanced ways. Because resource scarcity is rare in welfare states and because women are entering the job market in increasing numbers, there is less pressure for women to choose partners on the basis of the resources that they can potentially provide (Eagly & Wood, 1999; Kasser & Sharma, 1999). According to the dual-mating hypothesis, women face a set of trade-offs when seeking mates (Gangestad & Thornhill, 2008). Ideally, a woman would prefer a mate who possessed both putative markers of “good genes” (e.g., a masculine and symmetrical face) and displayed a willingness to invest resources. However, in practice, the mating market would preclude this option, forcing most women to make a compromise. Evidence suggests that this problem was partially resolved by utilizing a conditional mating strategy whereby a woman would select a long-term partner on the basis of a willingness to invest and engage in short-term mating with men who evinced markers of good genes (Gangestad & Simpson, 2000). If this is even partially true, and the need for resources is loosened, then more women may seek men on the basis of putative markers of good genes. Because such men are, of necessity, rare, this leads to heightened female competition. High-quality men can be expected to choose attractive women because they have the ability to exercise greater choice than do average men. This places additional pressures on women to stand out from their peers and to possess low WHR ratios and fit bodies. Indeed, evidence suggests that women with high self-perceived mate value develop increasingly stringent standards for mating, seeking not only men with high resource potential but also those who are physically attractive (i.e., possess indicators of good genes) (D. M. Buss & Shackelford, 2008). In freeing women from concerns specific to resources and thus allowing greater attention to shift to other qualities of

potential mates, affluent societies may invite women to “want it all” in a partner, fostering greater competition for small pools of men high in resource potential, willingness to invest, and indicators of good genes. Cross-cultural research could examine the relationship between social affluence and weight-related body dissatisfaction to examine the consistency of this relationship, controlling for other social influences such as ethnicity and religion.

Free Female Mate Choice Increases Body Dissatisfaction

Although freely choosing a partner may seem to be the modal mating pattern, it is not and was not in our evolutionary past (Apostolou, 2007; Broude & Greene, 1983; Puts, 2010). In a study of 190 hunter–gatherer societies, Apostolou found that parents and kin play a large, if not exclusive, role in deciding whom women marry in all but 4% of the societies. This pattern of parental control is also found in agropastoral societies (Apostolou, 2010). Because women in the West have greater freedom to choose mates, female–female competition is exacerbated for marriage partners. When kin and family play a role in choosing marriage partners, competition based on physical attractiveness is arguably less important than are other forms of competition, such as the bolstering of kin-group status or helping relatives obtain positions of prominence (Betzig, 1986; Ogden, 1999). It is not our intent to imply that female choice is nonexistent in societies in which family input may be primary. Specific societies may require parental approval of a woman’s choice, allow women to veto choices made by parents, or allow women to influence parents’ choice. However, we do argue that female choice is more powerful in Western societies than in traditional societies (Abed, 1998).

Free mate choice has the further effect of creating a “paradox of choice” whereby individuals who are predisposed toward being maximizers become excessively selective over their choice of mates (see, e.g., Gilbert, 2006; Schwartz, 2004; Schwartz et al., 2002). This may be especially the case as the number of potential romantic partners increases (see below). Such selectiveness, especially for long-term partners, serves to increase the importance of physical attractiveness in women and may increase body dissatisfaction. The degree to which cultural groups permit female free mate choice and the degree of body dissatisfaction among women in these cultures is a further variable that could be considered in cross-cultural research.

Socially Imposed Monogamy Increases Body Dissatisfaction

Socially imposed monogamy refers to laws or social norms that restrict the number of wives or husbands that a man or woman can possess to one. Although uncommon in the West, polygyny has been common throughout history (Betzig, 1986; Marlowe, 2003). Polygyny generally shifts the operational sex ratio in favor of women because some men take more than one wife, thus lowering the number of competitors that a woman faces. However, it is worth noting that, even in societies in which multiple wives are permitted, only a small percentage of men adopt such practices. When the operational sex ratio is high (i.e., there are more sexually

receptive men than women) there are fewer female competitors in relation to available, high-quality mates. Historically, periods during which the sex ratio favors women are characterized by lower divorce rates and higher levels of paternal investment (Pederson, 1991; Pollet & Nettle, 2008), whereas periods favoring men are characterized by liberal sexual mores, higher divorces, and lower paternal investment (Guttentag & Secord, 1983). Thus, under conditions of socially imposed monogamy, during which high levels of parental investment are needed to raise a child, women can be expected to compete intensely for marriageable men (Abed, 1998; Geary, 2010).

Increased Female Marriage Age Increases Body Dissatisfaction

Because of multiple economic, cultural, and psychological factors, the median age of female marriage has been steadily increasing since the 1960s. Before the 1960s in the United States, women's median age at marriage never exceeded 22 years. As of 2003, the median age at marriage for women stood at just over 25 years (Cherlin, 2005). Moreover, many women are deciding not to get married at all (Stevenson & Wolfers, 2007). Increasingly, women and men are choosing to cohabit (Seltzer, 2004) or, on college campuses, "hook up" (Bogle, 2008). Delayed marriage increases the number of years that a woman competes for a mate and increases the number of same-sex competitors, whereas other institutional arrangements do not provide the stability or consistent paternal investment that marriage does (Ono & Yielding, 2009) and so impel women to compete more intensely for male-derived resources such as status and income.

Increase in Competitors Increases Body Dissatisfaction

Although we may take being around a large number of age-similar peers for granted, this was not the case in human evolutionary history. A large cross-cultural study of hunter-gatherers revealed that median local group size was 30 (Marlowe, 2005). Even when group sizes were larger, the number of young unmarried women in any given location was many orders of magnitude smaller than it is in most high schools, universities, or urban environments (Dunbar, 1993). More than any other factor, the sheer number of competitors probably has the largest effect on female-female competition (Abed, 1998). Ethnographic studies, popular books, movies, and TV shows that are focused on middle and high schools document the stress, anger, and sadness that arise from competing with so many same-sex peers (L. Brown, 2003; Cecil, 2008; Eder, 1985; Merten, 1997; Milner, 2004; Simmons, 2002; Wiseman, 2009). A girl who is most attractive in her neighborhood may find that there are a dozen or so girls in her school who are more attractive. From this we would predict that body dissatisfaction will increase in prevalence with the size of same-age peer groups. Similarly, eating disorders most closely tied to body dissatisfaction such as BN will see increases of greater magnitude than for eating disorders such as AN for which the causal mechanisms appear to be more genetically determined. To make this more concrete, consider a more easily discernable form of competition: basketball. In a small group, being the best bas-

ketball player around is not terribly difficult. However, as the number of players increases, the chances of being the best decrease, as do the accolades that come with it. One can imagine the deleterious effects that would follow if basketball were as important to one's evolutionary success as attractiveness is for women.

The priming effects seen in media studies, in fact, may work by tricking the mind into thinking that media figures are competitors—in a sense increasing the number of competitors (e.g., Kanazawa, 2002). Such priming occurs in emotional and body-shape processing centers of the brain and takes place automatically (Friederich et al., 2007). Although with media images the effect seems to be minimal and the priming does not last long, with real human competitors the effects are constant and an ever-present reality. In a very real sense, then, a large group of same-sex competitors is the equivalent of being primed repeatedly in a media effects study. Furthermore, the indirect aggression and gossip that emanates from real competitors adds to the distress caused by comparison and competition.

Arms Race Played Out

Aside from the evidence already presented in this paper, other strands of evidence lend considerable support to the hypothesis that women are involved in an "arms race" in an attempt to attract mates (for evolutionary arms races, see Dawkins & Krebs, 1979). For example, girls and women have been found to rate the ideal female figure to be thinner than do men, that is, men find the ideal female body to be somewhat plumper than women think they do (Cohn et al., 1987; Dwyer, Feldman, Seltzer, & Mayer, 1969; Fallon, & Rozin, 1985). Consistent with these findings, Barber (1998) found that magazines targeting women showed slimmer women than did magazines targeting men. Thus, women are competing intrasexually to the point of attempting to obtain a figure that men actually do not prefer. The copious money that women spend on clothing and cosmetic products is also evidence of an increasing arms race to achieve attractiveness and status (Chao & Schor, 1998; Ectoff, 1999), as arguably women pay more attention to elements of "fashion" than do the men they wish to attract. Indeed, the female attention to body image and fashion seems to be a "spotlight" effect whereby they overestimate the salience of their appearance (Gilovich, & Savitsky, 1999). Perhaps because of the increasing pool of available mates, both men and women place more emphasis on looks when choosing a marriage partner than they did 60 years ago (D. M. Buss, Shackelford, Kirkpatrick, & Larsen, 2001).

Evolutionary Theory of Body Dissatisfaction

We have developed an evolutionary model of body dissatisfaction, which also addresses eating disorders, on the basis of a careful consideration of the evidence reviewed above. In many respects, the model proposed here builds upon the excellent suggestions of Abed (1998), who likewise viewed female competition as an important pathway to body dissatisfaction. This model focuses exclusively on women. We do not mean to suggest that physical attractiveness is an unimportant trait in men nor that men are uncompetitive. In fact, an evolutionary perspective fully predicts that men will compete intensely over access to women (Geary, 2010; Puts, 2010). However, male intrasexual competition

differs dramatically from female intrasexual competition. Therefore, an alternative model would likely be necessary to address male body dissatisfaction. The current model, although based on up-to-date research, is preliminary and should be considered fruitful for hypothesis generation. The accumulation of future data will likely necessitate significant revisions or rejection of the model. However, we hope that it leads to more synthetic, evolutionary based theories of body dissatisfaction and, potentially, eating disorders (see Figure 1).

F1

In this model, body dissatisfaction is conceived as an often functional response to a woman's perceived bodily shortcomings. In other words, women are hypothesized to possess cognitive and affective mechanisms that calibrate their comparative mate value. These calibration systems should be especially sensitive to the number and mate value of proximal women, and the number of available high-quality men. Therefore, such systems can be considered evolved adaptations (G. C. Williams, 1966). Genetic predispositions may lead to more sensitive or biased calibration, making it more likely that such individuals will develop body dissatisfaction. As was noted earlier, the research on peer influences suggests that these have a substantial (in the range of r of .3 to .4) influence on body dissatisfaction. Thus, in an environment in which peer competition for men is high, body dissatisfaction may be exacerbated. Similarly, an environment in which marriage is delayed—where there is socially imposed monogamy, free mate choice, and relative affluence—will promote female competition, thus heightening body dissatisfaction.

We wish to be careful to note that the process by which genes lead to body dissatisfaction is multistep, complex, and subtle. It is unlikely that there are any genes “for” body dissatisfaction per se.

Rather, complex interactions between multiple genes and the environment produce phenotypic variances in protein production, and these in turn lead to differences in the neurotransmitter systems responsible for producing personality traits. Individuals along the higher-risk end of personality distributions may be less well adapted to handling stress, including that due to female competition, potentially explaining the high comorbidity among AN, BN, and other stress-related psychological conditions such as anxiety and depression (Kaye et al., 2004; Santos, Richards, & Bleckly, 2007).

The precise relationship among genes, the sociocultural forces explicated in our model, body dissatisfaction, and eating disorders is extremely complex. As we noted, the etiology of eating disorders is not well understood. Furthermore, because the base rate of AN and BN is extremely low, most studies on the media and peers investigate increases in disordered eating symptomatology (perhaps the NOS category in the *DSM-IV*) rather than clinical AN or BN. Although we view facultative body dissatisfaction and some forms of disordered eating as highly flexible responses produced by cognitive and affective adaptations, we are extremely skeptical that AN and BN can be similarly explained. To use a comparative example, low mood can be viewed as an adaptive reaction to many life events such as the loss of status or an important interpersonal relationship. As such, positing an adaptive explanation for low mood is reasonable (Keller & Nesse, 2005; Nettle, 2009a). However, major depression, divorced from a proportionate external trigger, is unlikely to be adaptive and, therefore, requires a different set of explanations (Horwitz & Wakefield, 2007). AN and BN share a large genetic liability (Bulik et al., 2010), and seem to be the result of the dysfunction of many brain systems including, but

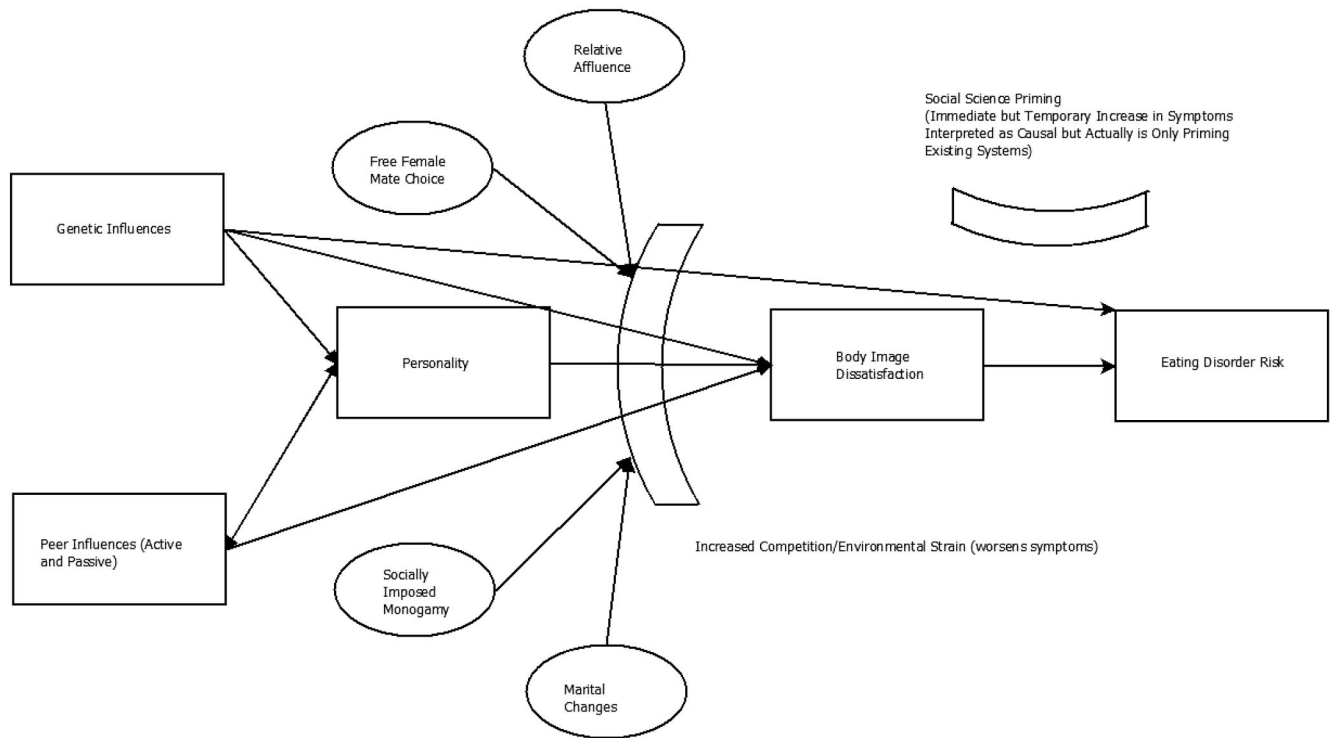


Figure 1. An evolutionary model of body dissatisfaction.

certainly not limited to, the endogenous opioid and endocannabinoid systems, and the mesolimbic dopaminergic system (Berridge, 2009; Kaye, 2010; Kaye, Fudge, & Paulus, 2009). Furthermore, the shared genetic liability among AN, BN, and many psychopathologies suggests that mutation selection balance or dysregulation of an evolved system is a more plausible explanation than are attempted adaptationist explanations (Keller & Miller, 2006). In our model, we note that there may be an independent path from genetic liability to eating disorders that bypasses body dissatisfaction, which is consistent with the research reviewed above. One reason eating disorders and body dissatisfaction are correlated is that both may share a latent genetic liability (Baker et al., 2009).

We reserve a restricted role for the media, which we feel is consistent with the relatively small effects of media exposure studies (with effect sizes estimated between $r = .08$ and $.17$). In the current model, media effects are not viewed as a primary causal pathway for developing body dissatisfaction or eating disorders. However, exposure to thin images in the media (or even vases and other innocuous objects) may “prime” this existing process. Viewing a thin image in the media reminds the viewer (some more than others) of the mating competition that takes place more intensely in real life. These reminders may be momentarily unpleasant, but actually have few lasting influences on the viewer. This may explain why experimental manipulations of thin media images do produce small reactions in viewers. However, this priming effect has been mistaken as causal because of the experimental designs utilized. In other words, researchers have mistaken activating an existing process with essentially causing a new one. Given that the results fit well with existing media effects paradigms, they have, arguably, been overemphasized. We note that priming studies in general tend to produce weak effects, including those examining cues of sexual competition (e.g., N. Li, Smith, Griskevicius, Cason, & Bryan, 2010). With such weak effects, it is possible to argue that priming studies are measuring a real response to temporary body image threats or that they are merely the product of demand characteristics or publication bias. Although a discussion of the limitations of priming studies is beyond the scope of this paper (see Turiel, 2009, 2010, for a discussion), it is reasonable to suggest that such studies are insufficient to support any particular theoretical perspective. Given that correlational and longitudinal studies of media effects produce equally small effects, we express concern that evidence from these lines of work is insufficient to support the weak effects found in laboratory media studies.

Some individuals may reasonably object that the media must have an effect given that advertisers spend billions of dollars to influence behavior. This perspective conflates two separate processes, essentially comparing the apples of advertising influences to the oranges of intrinsic behavior change. As Ferguson, Cruz, Martinez, Rueda, & Ferguson (2010) explained, the processes of advertising differ substantially from those posited by media effects paradigms. Advertisers, by and large, attempt to position specific brands to best appeal to existing consumer wants and needs (American Marketing Association, 2007). For example, advertisers for a new cola drink do not “program” viewers to suddenly want sweet drinks (something they already want), but rather attempt to persuade consumers that their sweet drink is the best. Therefore, when consumers buy sweet drinks, hopefully more of them will buy the product in question. Advertising may also promote loyalty by linking certain brands with a priori desirable

outcomes such as status or affiliation. For instance, marketers may attempt (not always successfully) to place a brand as “cool” for a particular group of individuals in hopes that peer-group influences lead to increase purchases of the product. In either case, no large changes in individual motivation are required for advertising to be effective. The motivation to seek out particular products—or indeed, status symbols—already exists prior to the advertisement. By contrast, media effects paradigms, whether focused on violence or body image, posit that media effects can have a substantial influence on a viewer’s underlying personality or motivations, causing violent behavior or psychopathology. Therefore, media effects paradigms depend on the media having a more profound impact on viewers than does advertising, which need only gently nudge behavior in order to be successful. Put more simply, the leap from buying a Coke to serious psychopathology is a more extreme leap than some scholars have indicated.

One might argue that competition with proximal peers does not differ from viewing images in the media. However, there is a very real psychological difference between competition with peers and imaginary competition with media figures. Real-life peers are far more relevant to a woman’s relative mate value. For example, even if young women think Megan Fox or Aishwarya Rai are paragons of beauty, they are equally aware that the men in their social circle stand no conceivable chance of mating with these women. By contrast, their female peers are directly competing with them for access to high-quality men. For example, consider a young woman who peruses Victoria’s Secret catalogue. She may be mildly distressed by comparing herself with the models in the catalogue. However, this distress would likely dissipate rapidly. On the other hand, if one of the models became a member of her peer group, her distress would likely be intense and prolonged. This distress and body dissatisfaction would be an adaptive response to her social circumstances because the model would lower her status among her peers and would have access to the same mate pool, resulting in an unwinnable competition.

An important and reasonable counterargument contends that the media can link body types to status; therefore if thin bodies are portrayed in the media, those body types will garner status and cause women to strive to obtain them (Wiseman, Gray, Mosimann, & Ahrens, 1992). There is validity to this argument; however, the body types that the media present are not arbitrary. Rather, they are often linked to health and reproductive potential because those are the bodies that men have evolved to prefer (Grammer, Fink, Moller, & Manning, 2005; Jasienska et al., 2004, 2006; Singh, Renn, & Singh, 2007). Therefore, even if women were attempting to obtain body types portrayed in the media, they would also be attempting obtain healthy-looking bodies and bodies that would allow them to compete successfully with mating rivals.

Understanding the Interplay Between Culture and Evolution

Integrating theories of culture and behavior with evolutionary theory has proven difficult (Laland & Brown, 2002). Although most psychologists acknowledge the contribution of both evolution and culture to human behavior, debates on evolutionary theory

often tend to fall back on absolutist positions (Smith, Borgerhoff-Mulder, & Hill, 2001). It is not the intent of the current theory to imply that acknowledging evolutionary influence on body dissatisfaction comes at the expense of cultural influences. Indeed, evolutionary theories are inherently interactional. The challenge is in explaining the substantial variation that exists, both within and between cultures, and relating it to underlying human universals (D. E. Brown, 2004).

Culture can be conceived of as consisting of both evoked and epidemiological elements (Tooby & Cosmides, 1992). Evoked culture arises from the interaction between species-specific psychological mechanisms and ecological variables (e.g., pathogens, war, resources), whereas epidemiological culture arises from the transmission of norms, beliefs, values, and inventions from person to person (Gangestad, Haselton, & Buss, 2006; Richerson & Boyd, 2005). We consider both evoked culture and epidemiological culture important to understanding body dissatisfaction.

According to our model, many aspects of body dissatisfaction result from evoked cultural factors. For example, we posit that women have evolved an acute sensitivity to assessing their relative mate value; therefore, when women compete with a large number of women of high mate value, there is an evoked increase in body dissatisfaction. Furthermore, cross-cultural mate preferences may be evoked by ecological conditions as discussed earlier in this review. This may partially explain Tovée, Swami, Furnham, and Mangalparsad's (2006) finding that South African Zulus who migrated to the United Kingdom adopted local body preferences.

It is also undoubtedly true that epidemiological culture is a vital factor in understanding the causes of body dissatisfaction. For example, certain cultures or peer groups may emphasize attractiveness to a greater or lesser degree. These norms will spread through social networks and influence female attitudes and behavior. Peer influences on body dissatisfaction can be transmitted through teasing, derogation, norms, and behaviors. Studies of social networks find that such networks influence everything from smoking to obesity (Christakis & Fowler, 2007, 2008), consistent with our view that peer influences are more potent than is media exposure.

Utilizing both evoked culture and epidemiological culture, our model can be used to make predictions within and between cultures. For example, because factors such as age at marriage and number of competitors are hypothesized to evoke greater body dissatisfaction in women, we predict that women living in urban environments will have higher levels of body dissatisfaction than will women living in rural environments, controlling for media exposure. We also predict that women living in more affluent neighborhoods will have higher body dissatisfaction than will women living in less affluent neighborhoods, a prediction supported by McLaren and Gauvin (2002). Furthermore, using epidemiological culture, we predict that body dissatisfaction will spread through social networks just as obesity has been shown to.

Understanding the individual as an active agent in this process may be one element in understanding individual-level variation in body dissatisfaction. Genetic variation may, of course, result in individual differences, but it is possible that other individual-level variables may be important to consider. For example, self-control has been found to be one of the strongest nongenetic predictors of antisocial behavior (Pratt & Cullen, 2005). It appears reasonable to hypothesize that self-control may also play a role in reducing the

influence of external factors in increasing body dissatisfaction. In our model, personality factors such as self-control represent a mediating step between both genetics and environmental influences and body dissatisfaction. Similarly, related to media effects, it may be reasonable to hypothesize whether the media may have a deleterious effect on only a small percentage of the population, despite not having general mass effect on the population at large. We do not believe that this hypothesis has yet been addressed in force, wherein most of the research has focused on the potential for general effects.

This discussion highlights the complexity of the interaction between culture and human nature. However, it should also dispel any notions that our evolutionary model is mechanistic or simplistic. We view our model as a simplified heuristic tool that attempts to capture a dynamic reality. It takes account of culture as well as biology and tries to do justice to environmental variables.

Conclusion

We believe that this current evolutionary model of body dissatisfaction is able to incorporate the disparate strands of evidence reviewed in our paper. Given that media effects are considerably smaller in size than genetic or peer influences, we believe that this model more carefully delineates the relative importance of these variables in the development of body dissatisfaction than have traditional media effects paradigms. Most important, we believe that this current model provides numerous outlets for future research and discussion on this important topic.

There is little doubt that heated debates on the role of media on body dissatisfaction and eating disorders will continue for some time. We argue here that these debates have ranged out of proportion to the available evidence and may have eclipsed more promising lines of research. We hope that the current review and proposed model will help recalibrate some of these discussions of body dissatisfaction and lead to improvements in the treatment and prevention of body dissatisfaction in the future.

References

- Abdollahi, P., & Mann, T. (2001). Eating disorder symptoms and body image concerns in Iran: Comparisons between Iranian women in Iran and in America. *International Journal of Eating Disorders, 30*, 259–268.
- Abed, T. R. (1998). The sexual competition hypothesis for eating disorders. *British Journal of Medical Psychology, 71*, 525–547.
- American Marketing Association. (2007). *Definition of marketing*. Retrieved November 23, 2008, from <http://www.marketingpower.com/AboutAMA/Pages/DefinitionofMarketing.aspx>
- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev.). Washington, DC: Author
- American Psychological Association. (2007). *Report of the APA task force on the sexualization of girls*. Retrieved November 10, 2009, from http://www.apa.org/pi/wpo/sexualization_report_summary.pdf
- Anderson, J. L., Crawford, C. B., Nadeau, J., & Lindberg, T. (1992). Was the Duchess of Windsor right? A cross-cultural review of the socioecology of ideals of female body shape. *Ethology and Sociobiology, 13*, 197–227.
- Anderson-Fye, E., & Becker, A. (2004). Socio-cultural aspects of eating disorders (pp. 565–589). In J. K. Thompson, Ed., *Handbook of eating disorders and obesity*. New York, NY: Wiley.

- Apostolou, M. (2007). Sexual selection under parental choice: The role of parents in the evolution of human mating. *Evolution and Human Behavior*, 28, 403–409.
- Apostolou, M. (2010). Sexual selection under parental choice in agropastoral societies. *Evolution and Human Behavior*, 31, 39–47.
- Archer, J., & Coyne, S. M. (2005). An integrated review of indirect, relational, and social aggression. *Personality and Social Psychology Review*, 3, 212–230.
- Baker, J. H., Maes, H. H., Lissner, L., Aggen, S. H., Lichtenstein, P., & Kendler, K. S. (2009). Genetic risk factors for disordered eating in adolescent males and females. *Journal of Abnormal Psychology*, 118, 576–586.
- Barber, N. (1998). Secular changes in standards of bodily attractiveness in American women: Different masculine and feminine ideals. *Journal of Psychology*, 132, 87–94.
- Baumeister, R. F., & Twenge, J. M. (2002). Cultural suppression of female sexuality. *Review of General Psychology*, 6, 166–203.
- Bearman, S. K., Presnell, K., & Martinez, E. (2006). The skinny on body dissatisfaction: A longitudinal study of adolescent girls and boys. *Journal of Adolescence*, 35, 217–229.
- Becker, A. E. (1995). *Body, self, and society: The view from Fiji*. Philadelphia, PA: University of Pennsylvania Press.
- Becker, A. E. (2005). Television, disordered eating, and young women in Fiji: Negotiating body image and identity during rapid social change. *Culture, Medicine, and Psychiatry*, 28, 533–559.
- Becker, A. E., Burwell, R. A., Gilman, S. E., Herzog, D. B., & Hamburg, P. (2002). Eating behaviours and attitudes following prolonged exposure to television among ethnic Fijian adolescent girls. *British Journal of Psychiatry*, 180, 509–514.
- Becker, A., Keel, P., Anderson-Fye, E., & Thomas, J. (2004). Genes and/or jeans? Genetic and socio-cultural contributions to risk for eating disorders. *Journal of Addictive Diseases*, 23, 81–103. doi:10.1300/J069v23n03_07
- Bell, R. M. (1985). *Holy anorexia*. Chicago: University of Chicago Press.
- Bemporad, J. R. (1996). Self-starvation through the ages: Reflections on the pre-history of Anorexia Nervosa. *International Journal of Eating Disorders*, 19, 217–237.
- Benenson, J. F., Hodgson, L., Heath, S., & Welch, P. J. (2008). Human sexual differences in the use of social ostracism as a competitive tactic. *International Journal of Primatology*, 29, 119–135.
- Benenson, J. F., Markovits, H., Thompson, M. E., & Wrangham, R. W. (2009). Strength determines coalitional strategies in humans. *Proceedings of the Royal Society B*, 276, 2589–2595.
- Berridge, K. C. (2009). “Liking” and “wanting” food rewards: Brain substrates and roles in eating disorders. *Physiology and Behavior*, 97, 537–550.
- Betzig, L. (1986). *Despotism and differential reproduction: A Darwinian view of history*. New York, NY: Aldine.
- Birkeland, R., Thompson, J., & Herbozo, S. (2005). Media exposure, mood, and body image dissatisfaction: An experimental test of person versus product priming. *Body Image*, 2, 53–61.
- Bissell, K. L., & Zhou, P. (2004). Must-see TV or ESPN: Entertainment and sports media exposure and body-image distortion in college women. *Journal of Communication*, 54, 5–21.
- Bjoerkqvist, K. (1994). Sex differences in physical, verbal, and indirect aggression: A review of recent research. *Sex Roles*, 30, 177–188.
- Blashill, A. J. (2011). Gender roles, eating pathology, and body dissatisfaction in men: A meta-analysis. *Body Image*, 8, 1–11.
- Bleske-Rechek, A., & Lighthall, M. (2010). Attractiveness and rivalry in women’s friendships with women. *Human Nature*, 21, 82–97.
- Bogle, K. A. (2008). *Hooking up: Sex, dating, and relationships on campus*. New York, NY: New York University Press.
- Bray, G. A. (1998). What is ideal body weight? *Journal of Nutritional Biochemistry*, 9, 489–492.
- Broude, G. J., & Greene, S. J. (1983). Cross-cultural codes on husband–wife relationships. *Ethnology*, 22, 263–280.
- Brown, D. E. (2004). Human universals, human nature, & human culture. *Daedalus*, 133, 47–54.
- Brown, L. (2003). *Girlfighting: Betrayal and rejection among girls*. New York, NY: New York University Press.
- Brown, P. J., & Konner, M. (1987). An anthropological perspective on obesity. *Annals of the New York Academy of Sciences*, 499, 29–46.
- Browne, K. (2007). *Co-ed combat: The new evidence that women shouldn’t fight the nation’s wars*. New York, NY: Sentinel.
- Brumberg, J. J. (2000). *Fasting girls: The history of anorexia nervosa*. New York, NY: Vintage Books.
- Bulik, C. M., Slof-Op’t Landt, M. C. T., van Furth, E. F., & Sullivan, P. F. (2007). The genetics of anorexia nervosa. *Annual Review of Nutrition*, 27, 263–275.
- Bulik, C. M., Sullivan, P. F., & Kendler, K. S. (1998). Heritability of binge-eating and broadly defined bulimia nervosa. *Biological Psychiatry*, 44, 1210–1218.
- Bulik, C. M., Thornton, L. M., Root, T. L., Pisetsky, E. M., Lichtenstein, P., & Pederson, N. L. (2010). Understanding the relation between anorexia nervosa and bulimia nervosa in a Swedish national twin study. *Biological Psychiatry*, 67, 71–77.
- Buss, A. H. (1961). *The psychology of aggression*. New York, NY: Wiley.
- Buss, D. M. (1989). Sex differences in human mate preferences: Evolutionary hypotheses tested in 37 cultures. *Behavioral and Brain Sciences*, 12, 1–49.
- Buss, D. M. (2008). *Evolutionary psychology: The new science of the mind* (3rd ed.). Boston, MA: Pearson.
- Buss, D. M., & Dedden, L. A. (1990). Derogation of competitors. *Journal of Personal Relationships*, 7, 395–422.
- Buss, D. M., & Schmitt, D. P. (1993). Sexual strategies theory: An evolutionary perspective on human mating. *Psychological Review*, 100, 204–232.
- Buss, D. M., & Shackelford, T. (2008). Attractive women want it all: Good genes, economic investment, parenting proclivities, and emotional commitment. *Evolutionary Psychology*, 6, 134–146.
- Buss, D. M., Shackelford, T. K., Choe, J., Buunk, B. P., & Dijkstra, P. (2000). Distress about mating rivals. *Personal Relationships*, 7, 235–243.
- Buss, D. M., Shackelford, T. K., Kirkpatrick, L. A., & Larsen, R. J. (2001). A half century of mate preferences: The cultural evolution of values. *Journal of Marriage and the Family*, 63, 491–503.
- Campbell, A. (1999). Staying alive: Evolution, culture, and women’s intrasexual aggression. *Behavioral and Brain Sciences*, 22, 203–252.
- Cashdan, E. (2008). Waist-to-hip ration across cultures: Trade-offs between androgen and estrogen dependent traits. *Current Anthropology*, 49, 1099–1107.
- Cecil, D. (2008). From *Heathers* to *Mean Girls*: An examination of relational aggression in film. *Journal of Criminal Justice and Popular Culture*, 15, 262–276.
- Chao, A., & Schor, J. B. (1998). Empirical tests of status consumption: Evidence from women’s cosmetics. *Journal of Economic Psychology*, 19, 107–131.
- Cherlin, A. J. (2005). American marriage in the early twenty-first century. *Future of Children*, 15, 33–56.
- Chomsky, N., & Herman, E. (1988). *Manufacturing consent: The political economy of the mass media*. New York, NY: Pantheon Books.
- Christakis, N. A., & Fowler, J. H. (2007). The spread of obesity in a large social network over 32 years. *New England Journal of Medicine*, 357, 370–379.
- Christakis, N. A., & Fowler, J. H. (2008). The collective dynamics of smoking in a large social network. *New England Journal of Medicine*, 358, 2249–2258.

- Clark, L., & Tiggemann, M. (2008). Sociocultural and individual psychological predictors of body image in young girls: A prospective study. *Developmental Psychology, 44*, 1124–1134.
- Cohen, J. (1992). A power primer. *Psychological Bulletin, 112*, 155–159.
- Cohn, L. D., Adler, N. E., Irwin, C. E., Jr., Millstein, S. G., Kegeles, S. M., & Stone, G. (1987). Body-figure preferences in male and female adolescents. *Journal of Abnormal Psychology, 96*, 276–279.
- Cornelissen, P. L., Tovee, M. J., & Bateson, M. (2009). Patterns of subcutaneous fat deposition and the relationship between body mass index and waist-to-hip ratio: Implications for models of physical attractiveness. *Journal of Theoretical Biology, 3*, 343–350.
- Coyne, S. M., Archer, J., & Eslea, M. (2006). “We’re not friends anymore! Unless . . .”: The frequency and harmfulness of indirect, relational, and social aggression. *Aggressive Behavior, 32*, 294–307.
- Crick, N. R. (1995). Relational aggression: The role of intent attributions, feelings of distress, and provocation type. *Development and Psychopathology, 7*, 313–322.
- Culbert, K., Breedlove, M., Burt, S., & Klump, K. (2008). Prenatal hormone exposure and risk for eating disorders. *Archives of General Psychiatry, 65*, 329–336.
- Cusumano, D., & Thompson, J. (1997). Body image and body shape ideals in magazines: Exposure, awareness, and internalization. *Sex Roles, 37*, 701–721.
- Dalley, S., Buunk, A., & Umit, T. (2009). Female body dissatisfaction after exposure to overweight and thin media images: The role of body mass index and neuroticism. *Personality and Individual Differences, 47*, 47–51.
- Dawkins, R., & Krebs, J. R. (1979). Arms races between and within species. *Proceedings of the Royal Society of London B, 205*, 489–511.
- Dixson, B., Dixon, A., Li, B., & Anderson, M. (2007). Studies of human physique and sexual attractiveness: Sexual preferences of men and women in China. *American Journal of Human Biology, 19*, 88–95. doi:10.1002/ajhb.20584
- Dohnt, H. K., & Tiggemann, M. (2005). Peer influences on body dissatisfaction and dieting awareness in young girls. *British Journal of Developmental Psychology, 23*, 103–116.
- Dunbar, R. I. M. (1993). Coevolution of neocortical size, group size and language in humans. *Behavioral and Brain Sciences, 18*, 681–735.
- Durante, K. M., & Li, N. P. (2009). Oestradiol level and opportunistic mating in women. *Biology Letters, 5*, 179–182.
- Durkin, S., & Paxton, S. (2002). Predictors of vulnerability to reduced body image satisfaction and psychological wellbeing in response to exposure to idealized female media images in adolescent girls. *Journal of Psychosomatic Research, 53*, 995–1005.
- Dwyer, J. T., Feldman, J. J., Seltzer, C. C., & Mayer, J. (1969). Body image in adolescents: Attitudes toward weight and perception of appearance. *American Journal of Clinical Nutrition, 20*, 1045–1056.
- Eagly, A., & Wood, W. (1999). The origins of sex differences in human behavior: Evolved dispositions versus social roles. *American Psychologist, 54*, 408–423.
- Eder, D. (1985). The cycle of popularity: Interpersonal relationships among female adolescents. *Sociology of Education, 58*, 154–165.
- Ember, C. R., Ember, M. T., Korotayev, A., & de Munck, V. (2005). Valuing thinness or fatness in women: Reevaluating the effect of resource scarcity. *Evolution and Human Behavior, 26*, 257–270.
- Escobar-Chaves, S. L., Tortolero, S. R., Markham, C. M., Low, B. J., Eitel, P., & Thickstun, P. (2005). Impact of the media on adolescent sexual attitudes and behaviors. *Journal of Pediatrics, 116*, 303–326.
- Etcoff, N. (1999). *Survival of the prettiest: The science of beauty*. New York, NY: Anchor Books.
- Fairburn, C. G., & Bohn, K. (2005). Eating disorder NOS (EDNOS): An example of the troublesome “not otherwise specified” (NOS) category in *DSM-IV*. *Behavior Research and Therapy, 45*, 691–701.
- Ferguson, C. J. (2009). An effect size primer: A guide for clinicians and researchers. *Professional Psychology: Research and Practice, 40*, 532–538.
- Ferguson, C. J., Cruz, A., Martinez, D., Rueda, S., & Ferguson, D. (2010). Violence and sex as advertising strategies in television commercials. *European Psychologist, 15*(4), 304–311.
- Ferguson, C. J., Munoz, M. E., Contreras, C., & Velasquez, K. (in press). Mirror, mirror on the wall: Peer competition, television influences and body image dissatisfaction. *Journal of Social and Clinical Psychology*.
- Ferguson, C. J., San Miguel, C., & Hartley, R. D. (2009). A multivariate analysis of youth violence and aggression: The influence of family, peers, depression and media violence. *Journal of Pediatrics, 155*, 904–908.
- Feshbach, N. D. (1969). Sex differences in children’s modes of aggressive responses toward outsiders. *Merrill Palmer Quarterly, 15*, 249–258.
- Fisher, M., & Cox, A. (2009). The influence of female attractiveness on competitor derogation. *Journal of Evolutionary Psychology, 7*, 141–155.
- Fombonne, E. (1995a). Anorexia nervosa: No evidence of an increase. *British Journal of Psychiatry, 166*, 462–471.
- Fombonne, E. (1995b). Is bulimia nervosa increasing in frequency? *International Journal of Eating Disorders, 19*, 287–296.
- Franzblau, A. (1958). *A primer of statistics for non-statisticians*. New York, NY: Harcourt, Brace & World.
- Fredrickson, B., & Roberts, T. (1997). Objectification theory: Toward understanding women’s lived experiences and mental health risks. *Psychology of Women Quarterly, 21*, 173–206. doi:10.1111/j.1471-6402.1997.tb00108.x
- Freedman, R. E., Carter, M. M., Sbrocco, T., & Gray, J. J. (2007). Do men hold African-American and Caucasian women to different standards of beauty? *Eating Behavior, 8*, 319–333. doi:10.1016/j.eatbeh.2006.11.008
- Friederich, H. C., Uher, R., Brooks, S., Giampietro, V., Brammer, M., Williams, S. C. R., . . . Campbell, I. C. (2007). I’m not as slim as that girl: Neural bases of body shape self-comparison to media images. *Neuroimage, 37*, 674–681.
- Frost, P. (2006). European hair and eye color: A case of frequency-dependent sexual selection? *Evolution and Human Behavior, 27*, 85–103.
- Gangestad, S. W., Haselton, M. G., & Buss, D. M. (2006). Evolutionary foundations of cultural variation: Evoked culture and mate preferences. *Psychological Inquiry, 17*, 75–95.
- Gangestad, S. W., & Simpson, J. A. (2000). The evolution of human mating: Trade-offs and strategic pluralism. *Behavioral and Brain Sciences, 23*, 573–644.
- Gangestad, S. W., & Thornhill, R. (2008). Human oestrus. *Proceedings of the Royal Society of London B, 275*, 991–1000.
- Gat, A. (2006). *War in human civilization*. New York, NY: Oxford University Press.
- Geary, D. C. (2000). Evolution and proximate expression of human paternal investment. *Psychological Bulletin, 126*, 55–77.
- Geary, D. C. (2010). *Male/female: The evolution of human sex differences* (2nd ed.). Washington, DC: American Psychological Association.
- Geary, D. C., Byrd-Craven, J., Hoard, M. K., Vigil, J., & Numtee, C. (2003). Evolution and development of boys’ social behavior. *Developmental Review, 23*, 444–470.
- Gilbert, D. (2006). *Stumbling on happiness*. New York, NY: Alfred K. Knopf.
- Gilovich, T., & Savitsky, K. (1999). The spotlight effect and the illusion of transparency: Egocentric assessments of how we are seen by others. *Current Directions in Psychological Science, 8*, 165–167.
- Gorwood, P., Kipman, A., & Foulon, C. (2003). The human genetics of anorexia nervosa. *European Journal of Pharmacology, 480*, 163–170.

- Gottschall, J. (2007). Greater emphasis on female attractiveness in *Homo sapiens*: A revised solution to an old evolutionary riddle. *Evolutionary Psychology*, 5, 347–357.
- Gottschall, J., Anderson, K., Burbank, C., Burch, J., Byrnes, C., Callanan, C., . . . Zocco, M. (2008). The “beauty myth” is no myth: Emphasis on male–female attractiveness in world folktales. *Human Nature*, 19, 174–188.
- Grabe, S., & Hyde, J. (2006). Ethnicity and body dissatisfaction among women in the United States: A meta-analysis. *Psychological Bulletin*, 132, 622–640.
- Grabe, S., Ward, L., & Hyde, J. (2008). The role of the media in body image concerns among women: A meta-analysis of experimental and correlational studies. *Psychological Bulletin*, 134, 460–476.
- Grammer, K., Fink, B., Møller, A. P., & Manning, J. T. (2005). Physical attractiveness and health: Comment on Weeden and Sabini. *Psychological Bulletin*, 131, 658–661.
- Grammer, K., Fink, B., Møller, A. P., & Thornhill, R. (2003). Darwinian aesthetics: Sexual selection and the biology of beauty. *Biological Review*, 78, 385–407.
- Grammer, K., & Thornhill, R. (1994). Human (*Homo sapiens*) facial attractiveness and sexual selection: The role of symmetry and averageness. *Journal of Comparative Psychology*, 108, 233–242.
- Groesz, L. M., Levine, M. P., & Murnen, S. K. (2002). The effect of experimental presentation of thin media images on body satisfaction: A meta-analytic review. *International Journal of Eating Disorders*, 31, 1–16.
- Guttentag, M., & Secord, P. (1983). *Too many women?* Beverly Hills, CA: Sage.
- Halliwel, E., & Dittmar, H. (2004). Does size matter? The impact of models’ body size on women’s body-focused anxiety and advertising effectiveness. *Journal of Social and Clinical Psychology*, 23, 104–122.
- Harrison, K., & Cantor, J. (1997). The relationship between media consumption and eating disorders. *Journal of Communication*, 47, 40–67.
- Harvey, J. A., & Robinson, J. D. (2003). Eating disorders in men: Current considerations. *Journal of Clinical Psychology and Medical Settings*, 10, 297–306.
- Heinberg, L. J., & Thompson, J. K. (1995). Body image and televised images of thinness and attractiveness: A controlled laboratory investigation. *Journal of Social and Clinical Psychology*, 14, 325–338.
- Hill, S. (2007). Overestimation bias in mate competition. *Evolution and Human Behavior*, 28, 118–123.
- Hill, S., & Buss, D. M. (2006). Envy and positional bias in the evolutionary psychology of management. *Managerial and Decision Economics*, 27, 131–143.
- Hoek, H. W. (2006). Incidence, prevalence and mortality of anorexia nervosa and other eating disorders. *Current Opinion in Psychiatry*, 19, 389–394.
- Hoek, H. W., van Harten, P. N., Hermans, K. M. E., Katzman, M. E., Matroos, G. E., & Susser, E. S. (2005). The incidence of anorexia nervosa on Curacao. *American Journal of Psychiatry*, 162, 748–752.
- Hoek, H. W., & van Hoeken, D. (2003). Review of the prevalence and incidence of eating disorders. *International Journal of Eating Disorders*, 34, 383–396.
- Holmstrom, A. (2004). The effects of media on body image: A meta-analysis. *Journal of Broadcasting and Electronic Media*, 48, 186–217.
- Horwitz, A. V., & Wakefield, J. C. (2007). *The loss of sadness: How psychiatry transformed normal sorrow into depressive disorder*. New York, NY: Oxford University Press.
- Jacobi, C., Hayward, C., de Zwann, M., Kraemer, H. C., & Agras, W. S. (2004). Coming to terms with risk factors for eating disorders: Application of risk terminology and suggestions for a general taxonomy. *Psychological Bulletin*, 130, 19–65.
- James, V., & Owens, L. D. (2005). ‘They turned around like I wasn’t there’: An analysis of teenage girls’ letters about their peer conflicts. *Social Psychology International*, 26, 71–88.
- Jasienska, G., Lipson, S. F., Ellison, P. T., Thune, I., & Ziolkiewicz, A. (2006). Symmetrical women have higher reproductive potential. *Evolution and Human Behavior*, 27, 390–400.
- Jasienska, G., Ziolkiewicz, A., Ellison, P. T., Lipson, S. F., & Thune, I. (2004). Large breasts and narrow waists indicate high reproductive potential in women. *Proceedings of the Royal Society of London B*, 271, 1213–1217.
- Jones, D. (2001). Social comparison and body image: Attractiveness comparisons to models and peers among adolescent girls and boys. *Sex Roles*, 45, 645–664. doi:10.1023/A:1014815725852
- Jones, D. (2004). Body image among adolescent girls and boys: A longitudinal study. *Developmental Psychology*, 40, 823–835.
- 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.
- Joseph, R. (1985). Competition between women. *Psychology: A Quarterly Journal of Human Behavior*, 22, 1–11.
- Joshi, R., Herman, C. P., & Polivy, J. (2004). Self-enhancing effects of exposure to thin-body images. *International Journal of Eating Disorders*, 35, 333–341.
- Kanazawa, S. (2002). Bowling with our imaginary friends. *Evolution and Human Behavior*, 23, 167–171.
- Kasser, T., & Sharma, Y. S. (1999). Reproductive freedom, educational equality, and females’ preference for resource-acquisition characteristics in mates. *Psychological Science*, 10, 374–377.
- Katzmaryk, P. T., & Davis, C. (2001). Thinness and body shape of *Playboy* centerfolds from 1978 to 1998. *International Journal of Obesity*, 25, 590–592.
- Kaukianinen, A., Bjorkqvist, K., Lagerspetz, K., Osterman, K., Salmivalli, C., Rothberg, S., & Ahlbo, A. (1999). The relationships between social intelligence, empathy, and three types of aggression. *Aggressive Behavior*, 25, 81–89.
- Kaye, W. (2008). Neurobiology of anorexia and bulimia nervosa. *Physiology and Behavior*, 94, 121–135.
- Kaye, W. (2010). Eating disorders: Hope despite mortal risk. *American Journal of Psychiatry*, 166, 1309–1311.
- Kaye, W. H., Bulik, C. M., Thornton, L., Barbarich, N., Masters, K., & the Price Foundation Collaborative Group. (2004). *American Journal of Psychiatry*, 161, 2215–2221.
- Kaye, W. H., Fudge, J. L., & Paulus, M. (2009). New insights into symptoms and neurocircuit function of anorexia nervosa. *Nature Reviews Neuroscience*, 10, 573–584.
- Keegan, J. (1994). *A history of warfare*. New York, NY: Random House.
- Keel, P. K., Heatherton, T. F., Dorer, D. J., Joiner, T. E., & Zalta, A. K. (2006). Point prevalence of bulimia nervosa in 1982, 1992, and 2002. *Psychological Medicine*, 36, 119–127.
- Keel, P. K., & Klump, L. K. (2003). Are eating disorders culture-bound syndromes? Implications for conceptualizing their etiology. *Psychological Bulletin*, 129, 747–769.
- Keeley, L. H. (1996). *War before civilization: The myth of the peaceful savage*. New York, NY: Oxford University Press.
- Keller, M. C., & Miller, G. F. (2006). Resolving the paradox of common, harmful, heritable mental disorders: Which evolutionary models work best? *Behavioral and Brain Sciences*, 29, 385–404.
- Keller, M. C., & Nesse, R. M. (2005). Is low mood an adaptation? Evidence for subtypes with symptoms that match precipitants. *Journal of Affective Disorders*, 27–35.

- Kenrick, D. T., & Keefe, R. C. (1992). Age preferences in mates reflect sex differences in human reproductive strategies. *Behavioral and Brain Sciences*, *15*, 75–91.
- Kenrick, D. T., Keefe, R. C., Gabrielidis, C., & Cornelius, J. S. (1996). Adolescents' age preferences for dating partners: Support for an evolutionary model of life-history strategies. *Child Development*, *67*, 1499–1511.
- Keski-Rahkonen, A., Bulik, C. M., Neale, B. M., Rose, R. J., Rissanen, A., & Kaprio, J. (2005). Body dissatisfaction and drive for thinness in young adult twins. *International Journal of Eating Disorders*, *37*, 188–199.
- Keski-Rahkonen, A., Hoek, H. W., Susser, E., Linna, M. S., Sihvola, E., Raevuori, A., . . . Rissanen, A. (2007). Epidemiology and course of anorexia nervosa in the community. *American Journal of Psychiatry*, *164*, 1259–1265.
- Klump, K. L., Miller, K. B., Keel, P. K., McGue, M., & Iacono, W. G. (2001). Genetic and environmental influences on anorexia nervosa syndromes in a population-based twin sample. *Psychological Medicine*, *31*, 737–740.
- Kraemer, H. C., Kazdin, A. E., Offord, D. R., Kessler, R. C., Jensen, P. S., & Kupfer, D. J. (1997). Coming to terms with the terms of risk. *Archives of General Psychiatry*, *54*, 337–343.
- Krones, P., Stice, E., Batres, C., & Orjada, K. (2005). In vivo social comparison to a thin-ideal peer promotes body dissatisfaction: A randomized experiment. *International Journal of Eating Disorders*, *38*, 134–142. doi:10.1002/eat.20171
- Laland, K. N., & Brown, G. (2002). *Sense and nonsense: Evolutionary perspectives on human behavior*. New York, NY: Oxford University Press.
- Lassek, W. D., & Gaulin, S. J. (2008). Waist–hip ratio and cognitive ability: Is gluteofemoral fat a privileged store of neurodevelopmental resources? *Evolution and Human Behavior*, *29*, 26–34.
- Law Smith, M. J., Perrett, D. I., Jones, B. C., Cornwell, R. E., Moore, F. R., Feinberg, D. R., . . . Hillier, S. G. (2006). Facial appearance is a cue to estrogen levels in women. *Proceedings of the Royal Society B*, *273*, 135–140.
- LeBlanc, S., & Register, K. E. (2003). *Constant battles: The myth of the peaceful, noble savage*. New York, NY: St. Martin's Press.
- Levine, M., & Murnen, S. (2009). "Everybody knows that mass media are/are not [pick one] a cause of eating disorders": A critical review of evidence for a causal link between media, negative body image, and disordered eating in females. *Journal of Social & Clinical Psychology*, *28*, 9–42. doi:10.1521/jscp.2009.28.1.9
- Li, N., Smith, A., Griskevicius, V., Cason, M., & Bryan, A. (2010). Intrasexual competition and eating restriction in heterosexual and homosexual individuals. *Evolution and Human Behavior*, *31*, 365–372. doi:10.1016/j.evolhumbehav.2010.05.004
- Lindberg, S. M., Grabe, S., & Hyde, J. S. (2007). Gender pubertal development, and peer sexual harassment predict objectified body consciousness in early adolescence. *Journal of Research on Adolescence*, *17*, 723–742.
- Lippa, R. A. (2007). The preferred traits of mates in a cross-national study of heterosexual and homosexual men and women: An examination of biological and cultural influences. *Archives of Sexual Behavior*, *36*, 193–208.
- Lipsey, M. W. (1998). Design sensitivity: Statistical power for applied experimental research. In L. Bickman & D. J. Rog (Eds.), *Handbook of applied social research methods* (pp. 39–68). Thousand Oaks, CA: Sage.
- Luxen, M. F., & Van De Vijver, F. J. R. (2006). Facial attractiveness, sexual selection, and personnel selection: When evolved preferences matter. *Journal of Organizational Behavior*, *27*, 241–255.
- Marlowe, F. (1999). The nobility hypothesis: The human breast as an honest signal of residual reproductive value. *Human Nature*, *9*, 263–271.
- Marlowe, F. W. (2003). The mating system of foragers in the standard cross-cultural sample. *Cross Cultural Research*, *37*, 282–306.
- Marlowe, F. W. (2005). Hunter–gatherers and human evolution. *Evolutionary Anthropology*, *14*, 54–67.
- Martin, M. C., & Kennedy, P. F. (1993). Advertising and social comparison: Consequences for female preadolescents and adolescents. *Psychology and Marketing*, *10*, 513–530.
- Mazur, A. (1986). U.S. trends in feminine beauty and overadaptation. *Journal of Sex Research*, *22*, 281–303.
- McCabe, M. P., & Ricciardelli, L. A. (2005). A prospective study of pressures from parents, peers, and the media on extreme weight change behaviors among adolescent boys and girls. *Behavior Research and Therapy*, *43*, 653–668.
- McLaren, L., & Gauvin, L. (2002). Neighborhood level versus individual level correlates of women's body dissatisfaction: Toward a multilevel understanding of the role of affluence. *Journal of Epidemiology and Community Health*, *56*, 193–199.
- Menzel, J. E., Schaefer, L. M., Burke, N. L., Mayhew, L. L., Brannick, M. T., & Thompson, J. K. (2010). Appearance-related teasing, body dissatisfaction, and disordered eating: A meta-analysis. *Body Image*, *7*, 261–270.
- Merten, D. E. (1997). The meaning of meanness: Popularity, competition, and conflict among junior high school girls. *Sociology of Education*, *70*, 175–191.
- Miller, G. F. (2000). *The mating mind: How sexual choice shaped the evolution of human nature*. New York, NY: Anchor Books.
- Miller, G. F. (2009). *Spent: Sex, evolution, and consumer behavior*. New York, NY: Viking.
- Milner, M., Jr. (2004). *Freeks, geeks, and cool kids: American teenagers, schools, and the culture of consumption*. New York, NY: Routledge.
- Monteath, S. A., & McCabe, M. P. (1997). The influence of societal factors on the female body image. *Journal of Social Psychology*, *137*, 708–727.
- Morris, D. (1999). *The naked ape: A zoologist's study of the human animal*. New York, NY: Delta.
- Nelson, L. D., & Morrison, E. (2005). The symptoms of resource scarcity: Judgments of food and finances influence preferences for potential partners. *Psychological Science*, *16*, 167–173.
- Nettle, D. (2009a). An evolutionary model of low mood states. *Journal of Theoretical Biology*, *25*, 100–103.
- Nettle, D. (2009b). Ecological influences on human behavioural diversity. *Trends in Ecology and Evolution*, *24*, 618–624.
- Nolen-Hoeksema, S., & Jackson, B. (2001). Mediators of the gender difference in rumination. *Psychology of Women Quarterly*, *25*, 37–47.
- Oesterman, K., Bjoerkqvist, K., Lagerspetz, K. M. J., Kaukiainen, A., Landau, S. F., Fraczek, A., & Caprara, G. V. (1998). Cross-cultural evidence of female indirect aggression. *Aggressive Behavior*, *24*, 1–8.
- Ogden, D. (1999). *Polygamy, prostitutes and death: The hellenistic dynasties*. London, UK: Duckworth.
- Ono, H., & Yilding, R. (2009). Marriage, cohabitation and childcare: The US and Sweden. *Social Indicators Research*, *93*, 137–140.
- Otterbein, K. F. (2004). *How war began*. College Station, TX: Texas A&M University Press.
- Owen, P., & Laurel-Seller, E. (2000). Weight and shape ideals: Thin is dangerously in. *Journal of Applied Social Psychology*, *30*, 979–990. doi:10.1111/j.1559-1816.2000.tb02506.x
- Parry-Jones, W. L. (1985). Archival exploration of anorexia nervosa. *Journal of Psychiatric Research*, *19*, 95–100.
- Parry-Jones, W. L., & Parry-Jones, B. (1991). Bulimia: An archival review of its history in psychosomatic medicine. *International Journal of Eating Disorders*, *10*, 129–143.
- Pawluck, D. E., & Gorey, K. M. (1998). Secular trends in the incidence of anorexia nervosa: Integrative review of population-based studies. *International Journal of Eating Disorders*, *23*, 347–352.

- Paxton, S. J., Schutz, H. K., Wertheim, E. H., & Muir, S. L. (1999). Friendship clique and peer influences on body image concerns, dietary restraint, extreme weight loss behaviours, and binge eating in adolescent girls. *Journal of Abnormal Psychology, 108*, 255–266.
- Pederson, F. A. (1991). Secular trends in human sex ratios: Their influence on individual and family behavior. *Human Nature, 2*, 271–291.
- Podar, I., & Allik, J. (2009). A cross cultural comparison of the Eating Disorder Inventory. *International Journal of Eating Disorders, 42*, 346–355.
- Polivy, J., & Herman, C. P. (2002). Causes of eating disorders. *Annual Review of Psychology, 53*, 187–214.
- Pollet, T. V., & Nettle, D. (2008). Driving a hard bargain: Sex ratio and male marriage success in a historical US population. *Biology Letters, 4*, 31–33.
- Pratt, T., & Cullen, F. T. (2005). Assessing macro-level predictors and theories of crime: A meta-analysis. In M. Tonry (Ed.), *Crime and justice: A review of research, Vol. 32* (pp. 373–450), Chicago, IL: University of Chicago Press.
- Presnell, K., Bearman, S. K., & Stice, E. (2004). Risk factors for body dissatisfaction in adolescent boys and girls: A prospective study. *International Journal of Eating Disorders, 36*, 389–401.
- Prince, R. (1985). The concept of culture-bound syndromes: Anorexia nervosa and brain-fag. *Social Science & Medicine, 21*, 197–203.
- Puts, D. A. (2010). Beauty and the beast: Mechanisms of sexual selection in humans. *Evolution and Human Behavior, 31*, 157–175.
- Rhodes, G., Simmons, L. W., & Peters, M. (2005). Attractiveness and sexual behavior: Does attractiveness enhance mating success? *Evolution and Human Behavior, 26*, 186–201.
- Richerson, P. J., & Boyd, R. (2005). *Not by genes alone: How culture transformed human evolution*. Chicago, IL: University of Chicago Press.
- Rilling, J. K., Kaufman, T. L., Smith, E. O., Patel, R., & Worthman, C. M. (2009). Abdominal depth and waist circumference as influential determinants of human female attractiveness. *Evolution and Human Behavior, 30*, 21–31.
- Roberts, A., Cash, T. F., Feingold, A., & Johnson, B. T. (2006). Are Black–White differences in females' body dissatisfaction decreasing? A meta-analytic review. *Journal of Consulting and Clinical Psychology, 74*, 1121–1131.
- Roberts, D. F. (2000). Media and youth: Access, exposure, and privatization. *Journal of Adolescent Health, 27*, 8–14.
- Rose, A. J., & Rudolph, K. D. (2006). A review of sex differences in peer relational processes: Potential trade-offs for the emotional and behavioral development of girls and boys. *Psychological Bulletin, 132*, 98–131.
- Rucas, S. L., Gurven, M., Kaplan, H., Winking, J., Gangestad, S., & Crespo, M. (2006). Female intrasexual competition and reputational effects on attractiveness among the Tsimane of Bolivia. *Evolution and Human Behavior, 27*, 40–52.
- Russell, C. J., & Keel, P. K. (2003). Homosexuality as a specific risk factor for eating disorders in men. *International Journal of Eating Disorders, 31*, 300–306.
- Sanderson, S. K. (2001). *The evolution of human sociality: A Darwinian conflict perspective*. Lanham, MD: Rowman & Littlefield.
- Santos, M., Richards, C. S., & Bleckley, M. K. (2007). Comorbidity between depression and disordered eating in adolescents. *Eating Behaviors, 8*, 440–449.
- Schwartz, B. (2004). The tyranny of choice. *Scientific American, 290*, 70–76.
- Schwartz, B., Ward, A., Monterosso, J., Lyubomirsky, S., White, K., & Lehman, D. R. (2002). Maximizing versus satisficing: Happiness is a matter of choice. *Journal of Personality and Social Psychology, 83*, 1178–1197.
- Seltzer, J. A. (2004). Cohabitation in the United States and Britain: Demography, kinship, and the future. *Journal of Marriage and Family, 66*, 921–928.
- Shroff, H., & Thompson, J. (2004). Body image and eating disturbance in India: Media and interpersonal influences. *International Journal of Eating Disorders, 35*, 198–203. doi:10.1002/eat.10229
- Shroff, H., & Thompson, J. (2006). Peer influences, body image satisfaction, eating dysfunction and self-esteem in adolescent girls. *Journal of Health Psychology, 11*, 533–551.
- Simmons, R. (2002). *Odd girl out: The hidden culture of aggression in girls*. Orlando, FL: Harcourt.
- Singh, D. (1993). Adaptive significance of female physical attractiveness: Role of waist-to-hip ratio. *Journal of Personality and Social Psychology, 65*, 293–307.
- Singh, D. (2006). Universal allure of the hourglass figure: An evolutionary theory of female physical attractiveness. *Clinics in Plastic Surgery, 33*, 359–370.
- Singh, D., & Randall, P. K. (2007). Beauty is in the eye of the plastic surgeon: Waist–hip ratio (WHR) and women's attractiveness. *Personality and Individual Differences, 43*, 329–340.
- Singh, D., Renn, P., & Singh, A. (2007). Did the perils of abdominal obesity affect depiction of feminine beauty in the sixteenth to eighteenth century British literature? Exploring the health and beauty link. *Proceedings of the Royal Society of London B, 274*, 891–894.
- Singh, D., & Singh, D. (2006). Role of body fat and body shape on judgment of female health and attractiveness: An evolutionary perspective. *Psychological Topics, 15*, 331–350.
- Smith, E., Borgerhoff-Mulder, M., & Hill, K. (2001). Controversies in the evolutionary social sciences: A guide for the perplexed. *Trends in Ecology and Evolution, 16*, 128–135.
- Smolak, L. (2004). Body image in children and adolescents: Where do we go from here? *Body Image, 1*, 15–28.
- Smolak, L., Levine, M., & Thompson, J. (2001). The use of the Sociocultural Attitudes Towards Appearance Questionnaire with middle school boys and girls. *International Journal of Eating Disorders, 29*, 216–223. doi:10.1002/1098-108X(200103)29:2::AID-EAT10113.0.CO;2-V
- Soh, N. L., Touyz, S. W., & Surgenor, L. J. (2006). Eating and body image disturbances across cultures: A review. *European Eating Disorders Review, 14*, 54–65.
- Spanos, A., Burt, S. A., & Klump, K. L. (2010). Do weight and shape concerns exhibit genetic effects: Investigating discrepant findings. *International Journal of Eating Disorders, 43*, 29–34.
- Stevenson, B., & Wolfers, J. (2007). Marriage and divorce: Changes and their driving forces. *Journal of Economic Perspectives, 21*, 27–52.
- Stice, E., & Shaw, H. E. (2002). Role of body dissatisfaction in the onset and maintenance of eating pathology: A synthesis of research findings. *Journal of Psychosomatic Research, 53*, 961–962.
- Strahan, E. (2003). *Selling thinness: How media images increase importance of weight and beauty as a basis of women's self esteem and decrease their body satisfaction and eating*. Unpublished doctoral dissertation. University of Waterloo, Ontario Canada.
- Striegel-Moore, R. H., & Cachelin, F. M. (2001). Etiology of eating disorders in women. *Counseling Psychologist, 29*, 635–661.
- Striegel-Moore, R. H., Schreiber, G. B., Pike, K. M., Wilfley, D. E., & Rodin, J. (1995). Drive for thinness in Black and White preadolescent girls. *International Journal of Eating Disorders, 18*, 59–69.
- Sumathipala, A., Siribaddan, S. H., & Bhugra, D. (2004). Culture-bound syndromes: The story of dhat syndrome. *British Journal of Psychiatry, 184*, 200–209.
- Swami, V., Frederick, D. A., Aavik, T., Alcalay, L., Allik, J., Anderson, D., . . . Zivcic-Becirevic, I. (2010). The attractive female body weight and female body dissatisfaction in 26 countries across 10 world regions: Results of the international body project I. *Personality and Social Psychology Bulletin, 36*(3), 309–325. doi:10.1177/0146167209359702

- Swami, V., Gray, M., & Furnham, A. (2006). The female nude in Rubens: Disconfirmatory evidence of the waist-to-hip ratio hypothesis of female attractiveness. *Imagination, Cognition and Personality, 26*, 139–147.
- Swami, V., & Tovée, M. J. (2006). Does hunger influence judgments of female physical attractiveness. *British Journal of Psychology, 97*, 353–363.
- Swami, V., & Tovée, M. (2008). The muscular male: A comparison of the physical attractiveness preferences of gay and heterosexual men. *International Journal of Men's Health, 7*, 59–71.
- Symons, D. (1979). *The evolution of human sexuality*. New York, NY: Oxford.
- Taylor, C., Sharpe, T., Shisslak, C., Bryson, S., Estes, L. S., Gray, N., . . . Killen, J. D. (1998). Factors associated with weight concerns in adolescent girls. *International Journal of Eating Disorders, 24*(1), 31–42. doi:10.1002/(SICI)1098-108X(199807)24:1<31::AID-EAT3>3.0.CO;2-1
- Thompson, J., & Stice, E. (2001). Thin-ideal internalization: Mounting evidence for a new risk factor for body-image disturbance and eating pathology. *Current Directions in Psychological Science, 10*, 181–183. doi:10.1111/1467-8721.00144
- Thompson, J., van den Berg, P., Roehrig, M., Guarda, A., & Heinberg, L. (2004). The Sociocultural Attitudes Towards Appearance Scale—3 (SATAQ—3): Development and validation. *International Journal of Eating Disorders, 35*, 293–304. doi:10.1002/eat.10257
- Thornhill, R., & Gangestad, S. W., (2008). *The evolutionary biology of human female sexuality*. New York, NY: Oxford University Press.
- Thornton, B., & Maurice, J. (1997). Physique contrast effect: Adverse impact of idealized body images for women. *Sex Roles, 37*, 433–439.
- Tiggemann, M. (2006). The role of media exposure in adolescent girls' body dissatisfaction and drive for thinness: Prospective results. *Journal of Social and Clinical Psychology, 25*, 523–541.
- Tooby, J., & Cosmides, L. (1992). The psychological foundations of culture. In J. Barkow, L. Cosmides & J. Tooby (Eds.), *The adapted mind: Evolutionary psychology and the generation of culture* (pp. 19–36). New York, NY: Oxford University Press.
- Tovée, M. J., & Cornelissen, P. L. (2001). Female and male perceptions of female physical attractiveness in front-view and profile. *British Journal of Psychology, 92*, 391–402.
- Tovée, M. J., Swami, V., Furnham, A., & Mangalparsad, R. (2006). Changing perceptions of attractiveness as observers are exposed to a different culture. *Evolution and Human Behavior, 27*, 443–456.
- Trampe, D., Stapel, D., & Siero, F. (2007). On models and vases: Body dissatisfaction and proneness to social comparison effects. *Journal of Personality and Social Psychology, 92*, 106–118.
- Trivers, R. L. (1972). Parental investment and sexual selection. In B. Campbell (Ed.), *Sexual selection and the descent of man 1871–1971* (pp. 136–179). Chicago, IL: Aldine.
- Turiel, E. (2009). The relevance of moral epistemology and psychology for neuroscience. In P. Zelazo, M. Chandler, & E. Crone (Eds.), *Developmental social cognitive neuroscience* (pp. 313–331). New York, NY: Taylor & Francis.
- Turiel, E. (2010). Snap judgment? Not so fast: Thought, reasoning, and choice as psychological realities. *Human Development, 53*, 105–109. doi:10.1159/000315167
- Vandereycken, W., & van Deth, R. (1994). *From fasting saints to anorexic girls: The history of self-starvation*. New York, NY: New York University Press.
- Wade, T. J. (2000). Evolutionary theory and self-perception: Sex differences in body esteem predictors of self-perceived physical and sexual attractiveness and self-esteem. *International Journal of Psychology, 35*, 36–45.
- Wade, T. J., & Cooper, M. (1999). Sex differences in the links between attractiveness, self-esteem and the body. *Personality and Individual Differences, 27*, 1047–1056.
- Wade, T., Wilkinson, J., & Ben-Tovim, D. (2003). The genetic epidemiology of body attitudes, the attitudinal component of body image in women. *Psychological Medicine, 33*, 1395–1405. doi:10.1017/S0033291703008572
- Want, S. C. (2009). Meta-analytic moderators of experimental exposure to media portrayals of women on female appearance satisfaction: Social comparisons as automatic processes. *Body Image, 6*, 257–269.
- Wasilenko, K., Kulik, J., & Wanic, R. (2007). Effects of social comparisons with peers on women's body satisfaction and exercise behavior. *International Journal of Eating Disorders, 40*, 740–745. doi:10.1002/eat.20433
- Wheeler, L., & Miyake, K. (1992). Social comparison in everyday life. *Journal of Personality and Social Psychology, 62*, 760–774.
- Wilfley, D., Schreiber, G., Pike, K., Striegel-Moore, R., Wright, D., & Rodin, J. (1996). Eating disturbance and body image: A comparison of a community sample of adult Black and White women. *International Journal of Eating Disorders, 20*, 377–387.
- Williams, G. C. (1966). *Adaptation and natural selection*. Princeton, NJ: Princeton University Press.
- Williams, P., & King, M. (1987). The “epidemic” of anorexia nervosa: Another medical myth? *Lancet, 1*, 205–207.
- Wilson, T. D. (2002). *Strangers to ourselves: Discovering the adaptive unconscious*. Cambridge, MA: Harvard University Press.
- Wilson, T. D., & Dunn, E. W. (2004). Self-knowledge: Its limits, value, and potential for improvement. *Annual Review of Psychology, 55*, 493–518.
- Wiseman, C. V., Gray, J. J., Mosiman, J. E., & Ahrens, A. H. (1992). Cultural expectations of thinness in women: An update. *International Journal of Eating Disorders, 11*, 85–89.
- Wiseman, R. (2009). *Queen Bees and wannabes: Helping your daughter survive cliques, gossip, boyfriends and the new realities of girl world*. New York, NY: Three Rivers Press.
- Wolf, N. (2002). *The beauty myth: How images of beauty are used against women*. New York, NY: Harper.
- Wonderlich, S. A., Joiner, T. E., Keel, P. K., Williamson, D. A., & Crosby, R. D. (2007). Eating disorder diagnoses: Empirical approaches to classification. *American Psychologist, 62*, 167–180.

Received October 6, 2010

Revision received December 17, 2010

Accepted December 20, 2010 ■