Attractiveness and Body Image: The Mediating Role of Body Mass Index

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Abstract

The purpose of this study was to examine the association between certain psychological and physical attributes and attractiveness in males and females. The psychological attributes studied included body-esteem, intelligence, and academic achievement. The physical attributes included body mass index (BMI) and the fluctuating asymmetry of 17 bilateral traits of the body. Seventy-six female and 77 male undergraduate students from Lakehead University participated in the study. Pictures of the participants were taken (face, both head profiles, and full frontal profile), their hands were scanned, imprints of their feet were obtained, and their height and weight were measured. They also completed the Concerns about Shape and Weight Scale as a measure of body-esteem, and the Shipley Institute for Living Scale as an index of IQ. Sixteen raters evaluated participants' attractiveness from the facial and whole person pictures. BMI and body-esteem were correlated with attractiveness, with BMI being a much stronger correlate of attractiveness for females than for males. Also, females reported greater concerns about shape and weight. Finally, the relationship between attractiveness and body-esteem was mediated by BMI. These results do not replicate the Davis et al. (2001; 2000) studies where more facially attractive females had greater weight and shape concerns. This study supports the idea of a "looking glass self" where our own self-perceptions reflect the perceptions of others about our appearance.

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Psychological and Physical Correlates of Attractiveness

In human interaction, physical appearance is the first piece of information obtained about another person. Whether or not an individual is attractive or not can influence this interaction. Walster, Aronson, Abrahams, and Rottman (1966) found that attractiveness was the only significant predictor of the level of satisfaction that male and female college students had concerning their blind date. Attractive individuals are also assumed by others to possess more positive traits than their less attractive counterparts. For instance, people who rate male and female college students (n = 173 and 255, respectively) as more attractive also believe such individuals (a) are more scholastically and socially competent, and (b) possess greater emotional well-being and body-esteem (Davis, Colburn, Brown, Slatkoff, & Taylor, 2000). One purpose of the current study was to determine whether certain of these attractiveness assumptions of the rater are actually matched by the experience of the individual being rated. A second purpose was to determine the association between attractiveness and certain physical characteristics.

What is Attractiveness?

A person is considered to be physically attractive if she or he is aesthetically appealing to others. Typically, in psychological studies, raters evaluate the physical attractiveness of people by looking at the facial pictures of the participants. Ratings are then averaged over raters to determine each person's overall level of attractiveness. Attractiveness is usually measured using either a ranking or rating scale. With a ranking scale, pictures of individuals are ranked from most attractive to least attractive. This method is useful because it allows for strict comparisons between individuals, however, two individuals cannot be considered to be equally attractive. Rating scales are usually Likert scales that are anchored "extremely unattractive" to "extremely

attractive". Each individual picture is given its own score on the Likert scale. With this latter method, the experimenter obtains more information as the rater can feel that two people are equally attractive rather than being forced to place one individual above or below another. As a result, rating rather than ranking scales are used more frequently to measure attractiveness (Feingold, 1992).

For psychological studies about attractiveness to be informative there must be consistent standards of attractiveness. The well-known saying that "beauty is in the eye of the beholder" would lead one to believe that people have idiosyncratic opinions about who is more or less attractive. Therefore, one might speculate that different people would assign quite different ratings of attractiveness to the same person. However, in a recent meta-analysis, Langlois et al. (2000) found that there is a consensus about standards of attractiveness. They obtained a high level of agreement among raters from the same culture. For adults rating other adults on attractiveness, there was extremely high inter-rater reliability with an $\underline{r} = .90$. For adults from the same culture rating the attractiveness of children, there was also high levels of agreement with an $\underline{r} = .85$. In another study, Rosenblum and Lewis (1999) obtained an $\underline{r} = .53$ for inter-rater reliability of attractiveness ratings. All of these reliability indices are quite high. Therefore, adults of the same culture tend to agree about who is and is not attractive. Even so, one might expect that different cultures would have very distinct standards of attractiveness. Surprisingly, however, Langlois et al. (2000) found that the cross-cultural inter-rater reliability was $\underline{r} = .94$. Cunningham, Roberts, Barbee, Druen, and Wu (1995) also found high inter-rater reliability across cultures and ethnic groups (i.e., Asian, Hispanic, and Caucasian). These findings demonstrate that, even cross-culturally, there are high levels of agreement about who is and is not

attractive. The fact that there is a consensus among raters about who is attractive even across cultures allows us to operationalize the construct with confidence.

Psychological Correlates of Attractiveness

Attractive people are judged more positively by others, regardless of the level of personal familiarity between them. This phenomenon has been referred to in the literature as the "beautiful is good" stereotype (Feingold, 1992). A meta-analysis by Langlois et al. (2000) found that attractive people are judged by raters to have greater occupational and interpersonal competence, and to be less anxious or less lonely. Raters also expect that attractive individuals will get better jobs, have happier marriages, and lead more fulfilling lives than less attractive individuals (Dion, Berscheid, & Walster, 1972). Attractive individuals are also treated better by others: They receive more attention and cooperation from others (Langlois et al., 2000).

Research has also found that attractive people are actually different than less attractive individuals in other ways. Langlois et al. (2000) found that attractive people do in fact experience greater occupational success, are more popular, have more dating experience and more sexual experience, are in better physical health, are more extraverted, and have better social skills, and better mental health. Another meta-analysis by Feingold (1992) found that attractive individuals are less lonely, experience less social anxiety, have higher public self-consciousness, better social skills, are more popular with the opposite sex, have more same-sex friends, and experience a greater variety of sexual activities than less attractive individuals. Attractiveness correlates positively with occupational success in the military (Dickey-Bryant, Lautenschlager, Mendoza, & Abrahams, 1986). Self-reported popularity is positively correlated with other-rated attractiveness for women but not for men (Feingold, 1984). However, when attractiveness is

self-rated, attractiveness positively correlates with self-reported popularity for both men and women (Feingold, 1984; Walster et al., 1966). The fact that attractive individuals actually possess more positive traits is the most intriguing observation. Why would this occur? Evolutionary theories might help us to understand these results.

Evolutionary theories predict that certain psychological traits would be related to one's attractiveness as a result of sexual selection (Buss, 1985). For example, Langlois et al. (2000) explain how intelligence and attractiveness would end up being related traits. Females tend to prefer males that are able provide for their offspring, while males prefer attractive females. As a result, attractive women would succeed in mating with males that are best able to provide for their offspring. Intelligent males would usually have the best resources. Consequently, attractive women would tend to mate with intelligent males. The offspring would then tend to inherit both traits of intelligence and attractiveness. After many generations of this assortative mating, attractive individuals would tend to be more intelligent than less attractive individuals.

While this theory has certain appeal, the research results are mixed about whether attractive individuals are in fact are more intelligent than less attractive ones. Research has found that the physical attractiveness of school children positively correlates with their grade point average (Zahr, 1985). However, this correlation may be due to the reality that attractive children actually are actually more intelligent, or there may be a mediating variable causing this relationship. For example, the teacher may have treated the attractive children differently by providing more assistance to them, thereby resulting in higher grades. Further research would need to rule out mediating variables between attractiveness and scholastic competence before any firm conclusions can be made. As for intelligence, the meta-analysis of Langlois et al. (2000)

suggests that there is really no difference in the IQs of attractive and less attractive individuals. This replicates Feingold's (1992) earlier meta-analytic finding of no relationship between attractiveness and IQ. Therefore, the research findings are unclear about whether there is or is not a relationship between attractiveness, scholastic competence, and the related construct of intelligence.

The findings are mixed concerning the relationship between the observer-rated attractiveness and the perceived intelligence of those being rated. In their meta-analysis, Langlois et al. (2000) found that attractive individuals are judged to be more intelligent and occupationally competent. A recent study by Chia, Allred, Grossnickle, and Lee (1998) found contradictory results: Attractive males and females were judged to have average intelligence, while unattractive males were assumed to be the most intelligent, and unattractive females the least intelligent. However, this study did not investigate the full range of attractiveness as they only used four stimulus pictures of people that were previously judged to be the most and least attractive male and female pictures. Because of these limited stimuli, these findings are of questionable generalizability.

Research suggests that individuals with better genes may be less susceptible to harmful environmental influences that could have adverse effects on their IQ scores (Blinkhorn, 1997; Furlow, Armijo-Prewitt, Gangestad, & Thornhill, 1997). Furlow et al. (1997) found that individuals with less fluctuating asymmetry have higher IQ scores. The theoretical explanation for these findings is unknown at this time. However, these results suggest that individuals with better genes should have higher IQ scores. Evolutionary theories propose that attractiveness is an honest advertisement of good genes (Buss, 1985; Buss & Barnes, 1986; Buss & Schmidt, 1993).

If evolutionary theories are correct, attractive individuals would have better genes, and therefore, would be more intelligent and scholastically competent. One purpose of the present study was to investigate whether attractive individuals are in fact more intelligent.

Attractiveness and Body Image

Recall that R. Davis et al. (2000) found that more attractive male and female college students were believed by raters to also possess a more positive body image. The question arises as to whether attractive people do actually feel better about their bodies. Only two studies have directly investigated this question and the findings suggest the opposite occurs: Among females, those rated more attractive possess a worse body image.

Davis, Claridge, and Fox (2000) studied the relationship between objective facial attractiveness and weight preoccupation. The participants were 203 female university students. Participants completed the Drive for Thinness, Body Dissatisfaction, and the Bulimia subscales of the Eating Disorder Inventory (Garner & Olmstead, 1984) as a measure of "weight preoccupation" . These females were rated for facial attractiveness by one female judge. The judge was instructed to rate each female before any interaction took place. Also, the judge was told that the slenderness or fatness of the participant should not influence her facial attractiveness rating. The attractiveness ratings were made on a scale of 0-10 with increments of 0.5. The judge was unaware of the study hypothesis that more facially attractive females would experience greater weight preoccupation. After controlling for body size, the hypothesis was confirmed: More facially attractive females reported more weight preoccupation. However, this study had some methodological weaknesses that bear upon the internal and external validity of the findings. First of all, the objective facial attractiveness ratings rely upon one female judge. Also, only the

faces of the females were rated for attractiveness. In reality, attractiveness judgments are made based upon the image of the entire person.

Davis, Shuster, Dionne, and Claridge (2001) attempted to replicate the aforementioned results that more facially attractive females are more weight preoccupied. In this study, 100 female university students participated. Weight preoccupation was once again measured using the Drive for Thinness, Body Dissatisfaction, and Bulimia subscales of the Eating Disorder Inventory. The objective facial attractiveness ratings were improved in this study. Four males and four females rated head and shoulders pictures of the participants for facial attractiveness. Subjective facial attractiveness was measured using questions that inquire about facial appearance only. The findings from the C. Davis et al. (2000) study were replicated: More facially attractive females reported greater weight preoccupation, after controlling for body size. However, there are some criticisms of this study. Once again, the objective attractiveness ratings were only based upon facial attractiveness. More realistically, objective attractiveness is based upon the whole body, the clothing the individual is wearing, and also the accessories that are worn (Ashmore, Solomon, & Longo, 1996). This study also only used females as participants thereby limiting its generalizability. The relationship between objective attractiveness and weight preoccupation should also be examined in males.

Davis et al. (2001) explain the positive relationship between objective facial attractiveness and weight preoccupation using the expectancy model. More specifically, they suggest that this relationship is due to a self-fulfilling prophecy effect. Davis et al. (2001) suggest that these facially attractive females could develop qualities the others expect of them. These women would begin to behave how they think attractive individuals should behave and,

since society tends to believe that what is beautiful must be thin, these women could develop weight and diet concerns. Davis et al. (2001) also suggest that more facially attractive females probably receive more praise for their attractiveness than would less attractive individuals. They propose this social feedback leads the attractive female to invest more of her self-worth in appearance-related issues, potentially resulting in more weight preoccupation.

In a review of the expectancy model and the self-fulfilling prophecy effect, Miller and Turnbull (1986) conclude that "there is no empirical or logical justification for the assumption that an expectancy is more likely to lead perceivers to act in a manner which will fulfill the expectancy than it is to lead them to act in a manner which will disconfirm it." (p. 251). This conclusion argues against the theoretical perspective that Davis et al. (2001) invoke to explain their findings. Furthermore, their findings that more attractive females have greater weight preoccupation seems counterintuitive. More logically, one would expect that, in general, the more attractive a female is, the less (not more) her weight preoccupation would be. However, on the other hand, a more attractive female could have more to lose by gaining weight (i.e., her "attractive" status).

This theoretical point of view of Davis et al. (2001) is also in contrast to the predictions of symbolic interactionist theory. Symbolic interactionism purports that one's self-concept is derived through perceptions of how one is viewed by others. This idea, originally developed by Cooley (1902), is known as the "looking glass self". There are three components of the looking glass self: a) how you view yourself (self-appraisals), b) how you think others view you (reflected appraisals), and c) how others actually view you (actual appraisals). All self-appraisals are considered to be a product of one's perception of the actual appraisals of others. It is further

proposed that the influence of actual appraisals on self-appraisals is mediated by reflected appraisals. Empirical evidence supports this mediational model (O'Connor & Dyce, 1993; Schafer & Keith, 1985). Evidence also supports the idea that the actual and reflected appraisals of significant others influence one's self-appraisals (Felson, 1989). However, individuals actually do not demonstrate much accuracy in correctly perceiving the appraisals of specific significant others. Instead, individuals are accurate in determining how others in general appraise them (Felson, 1989; O'Connor & Dyce, 1993; Shrauger & Schoeneman, 1979). This research supports Mead's (1934) concept of the generalized other. Perhaps then, the actual appraisals of others in general is more influential in determining one's self-concept than those of specific significant others. In terms of attractiveness, the actual appraisals of others in general and one's perception of these appraisals (reflected appraisals) would determine one's self-appraisal of attractiveness. Therefore, this model predicts that more objectively attractive females (actual appraisals) should possess a better (not worse) body image (self-appraisals). Lerner (1987) also explains the relationship between body image and attractiveness in a similar way with the "circular functions" hypothesis. This hypothesis states that one's appearance influences responses from others which, in turn, influence the person's own sense of physical attractiveness. It is through this interpersonal feedback mechanism that a relationship between body image and physical attractiveness is believed to develop.

One purpose of the present study was to investigate the relationship between body image and attractiveness in both females and males to determine if more attractive individuals have better body-esteem. Following from the theoretical perspective above, it was predicted that attractive people will have a better body image.

Physical Correlates of Attractiveness

One of the most robust correlates of attractiveness is that of the waist-to-hip ratio (WHR), the ratio of waist circumference to hip circumference. A WHR of 0.7 is rated as most attractive for female drawings, while a ratio near 1.0 is rated as most desirable for male figures (Furnham, Dias, & McClelland, 1998; Furnham, Tan, & McManus, 1997; Singh & Young, 1995; Singh, 1995; Tassinary & Hansen, 1998). Patterns of fat deposition are influenced by hormones. In females, oestrogen leads to fat cell accumulation on the buttocks and thighs. In males, testosterone causes fat to accumulate in the abdominal area (Furnham et al., 1997). Consequently, a WHR of 0.7 for females and 0.9-1.0 for males is thought to be indicative of optimum hormonal functioning and, hence, reproductive health.

The WHR studies also investigate three levels of body weight: light, moderate, and heavy. Research suggests that body weight may be an even more important determinant of attractiveness ratings than WHR (Furnham et al., 1998; Furnham et al., 1997; Singh & Young, 1995; Singh, 1995; Tassinary & Hansen, 1998). Moderate body size is the most preferred for males and females. The least preferred body size for males is underweight, while for females the least preferred body size is overweight. While these results are consistent and well-documented, recent research provides evidence that these studies confound WHR and body mass index (BMI). These findings raise the possibility that the WHR findings are inflated and, are in part due to the influence of BMI on ratings of a person's attractiveness (Tovee, Maisey, Emery, & Cornelissen, 1999).

BMI is perhaps the strongest physical determinant of attractiveness and it is an important determinant of health. Tovee et al. (1999) had 40 male undergraduate students rate color photos

of 50 women for attractiveness. The faces were obscured to avoid the influence of facial attractiveness. BMI ranged from below 15 to above 30. The main advantage of this study was that an accurate BMI could be determined for each woman by measuring her height and weight. Tovee et al. (1999) found that a BMI of 18 or 19 was most preferred and that small increases or decreases from there resulted in large differences in attractiveness ratings. They also found that the path length around the perimeter of a figure divided by the area within the figure, referred to as perimeter-area ratio (PAR), correlates extremely well with BMI. Therefore, PAR is an accurate visual indicator of BMI. With the use of PAR, Tovee et al. (1999) determined that BMI and WHR were confounded in the previous studies. In their study, WHR and BMI were not confounded, and BMI was much more important in determining attractiveness than was WHR. BMI accounted for 74% of the variance in attractiveness ratings of females, while WHR only accounted for 2%. Males were not studied.

An earlier study by Tovee, Reinhardt, Emery, and Cornelissen (1998) found that BMI accounted for 74% of the variance in female attractiveness, while WHR accounted for only 2%. Tovee and Cornelissen (in press) replicated these results, finding that BMI correlates more strongly with female attractiveness than does WHR. They also found that BMI is a better visual cue than WHR because it demonstrates view invariance (front-view and profile BMI correlate well with actual BMI), while WHR does not. R. Davis et al. (2000) found that BMI is negatively correlated with attractiveness for both males and females, though the relationship was stronger for females.

Maisey, Vale, Cornelissen, and Tovee (1999) had females rate males for attractiveness. They found that BMI only accounted for 13% of the variance in attractiveness ratings, while

waist-to-chest ratio (WCR), the ratio of waist circumference to chest circumference, accounted for 56%. A WCR that results in an "inverted triangle" shape was rated as most attractive, and even small changes from this shape resulted in lower attractiveness ratings (Maisey et al., 1999). Overall, BMI seems to be a much more important correlate of attractiveness for females than for males. For males, research suggests that WCR is a more important correlate of attractiveness than BMI. One purpose of this study was to revisit the relationship between BMI and physical attractiveness for both males and females, because sex comparisons regarding this relationship has only been reported in one study (R. Davis et al., 2000).

In the Tovee et al. (1999) study, female faces were obscured to avoid the influence of facial attractiveness in ratings of bodily attractiveness. The facial features of a person are influential on ratings of physical attractiveness. One such feature is hemifacial symmetry. More bilaterally (hemifacial) symmetrical faces are rated as more attractive (Gangestad, Thornhill, & Yeo, 1994; Grammar & Thornhill, 1994; Mealey, Bridgstock, & Townsend, 1999; Perrett et al., 1999; Rhodes, Proffitt, Grady, & Sumich, 1998; Thornhill & Gangestad, 1999a; Tovee, Tasker, & Benson, 2000; Scheib, Gangestad, Thornhill, 1999). Even with monozygotic twins, the more facially symmetrical twin is rated as more attractive (Mealey et al., 1999).

Rhodes et al. (1998) had students rate the attractiveness of 48 faces which had four versions with different degrees of symmetry: low, normal, high, and perfect. One version of each face was rated by each participant. Also, because degree of facial symmetry is supposed to influence mate choice, participants rated the opposite-sex pictures for how appealing they are as a life partner. They found that facial symmetry was positively correlated with both attractiveness and mate appeal.

Theories have been proposed to explain the relationship between hemifacial symmetry and attractiveness. Asymmetry is thought to demonstrate that the individual was unable to maintain developmental stability (Gangestad et al., 1994; Grammar & Thornhill, 1994; Mealey et al., 1999; Perrett et al., 1999; Thornhill & Gangestad, 1999a; Tovee et al., 2000). In other words, a person with higher symmetry is thought to be more resilient and healthy. Parasite theory is another similar, but more specific explanation for why hemifacial symmetry is considered attractive. This theory states that sexual selection favours the traits which would indicate resistance to parasites. Hemifacial symmetry, according to this theory, indicates good health and is therefore the favoured trait (Grammar & Thornhill, 1994).

If these theories are correct, individuals with more facial symmetry should be healthier. In fact, hemifacial symmetry is correlated with physical and psychological health. Individuals with greater hemifacial asymmetry experience more psychological, emotional, and physiological problems (Shackelford & Larsen, 1997a). However, research results are mixed about whether individuals that are more facially attractive are also healthier. Shackelford and Larsen (1997b) found that individuals that were rated as more facially attractive had better cardiovascular health, less complaints of headaches, and less complaints of a runny or stuffy nose. However, Kalick, Zebrowitz, Langlois, and Johnson (1998) found that facial attractiveness is unrelated to health. Therefore, further research is needed to determine whether more attractive individuals are actually healthier. If attractive individuals are found to be healthier, this finding would support the good gene hypothesis.

Furthermore, evolutionary theory predicts that degree of hemifacial symmetry should influence mate choice. Opposite-sex raters actually prefer individuals with higher facial

symmetry as lifetime partners (Rhodes et al., 1998). This finding provides support for both the good gene hypothesis and mate-selection theory. Overall, research suggests that individuals with greater hemifacial symmetry are rated as more attractive. Furthermore, there is evidence suggesting that individuals with greater hemifacial symmetry are healthier, and are preferred as long-term mates by the opposite sex. One purpose of the present study was to attempt to replicate the relationship between hemifacial symmetry and attractiveness.

Fluctuating asymmetry is another correlate of attractiveness. Fluctuating asymmetry is the asymmetry of bilateral traits on the body (e.g., hands, feet, wrists, ankles, etc.). It is termed fluctuating asymmetry because the direction of asymmetry is not genetically controlled and can vary from one generation to the next. Also, the population mean of right sided trait (e.g., length of index finger) minus that for the same left-sided trait is zero and the distribution is approximately normal. Individuals with lower fluctuating asymmetry are rated as more facially attractive (Gangestad et al., 1994; Thornhill & Moller, 1998; Tovee, Tasker, & Benson, 2000), albeit the correlations are generally low yet significantly different from zero.

Those individuals with more symmetry are thought to be more resistant to environmental and genetic disturbances (Gangestad et al., 1994). As with facial symmetry, theory suggests that individuals with less fluctuating asymmetry are better mates. In fact, for many different species including humans, there is a moderate negative relationship between bilateral asymmetry and mating success (Moller & Thornhill, 1998). For humans, an individual's level of fluctuating asymmetry correlates negatively with the number of sex partners that person has had and correlates positively with age at first copulation (Thornhill & Gangestad, 1994). This suggests that individuals with less fluctuating asymmetry mate with more people and begin mating at an

earlier age. Interestingly, ovulating females prefer the scent of symmetrical males (Thornhill & Gangestad, 1999b). These results suggest that there may be a pheromone that signals reproductive fitness. Research has also found that there is a negative relationship between fluctuating asymmetry and IQ in males and females (Furlow et al., 1997). This suggests that individuals with less fluctuating asymmetry are more intelligent. One purpose of the present study was to attempt to replicate previously published correlations among fluctuating asymmetry, health, IQ, and attractiveness in males and females. The hypotheses of this study were that more attractive individuals would have better body-esteem, less fluctuating asymmetry, a lower body mass index, higher IQ scores, and greater overall health.

Method

Participants

Seventy-six female and 77 male undergraduate students from Lakehead University Introductory Psychology classes volunteered for the study and received one bonus point toward their final grade for their participation. The mean age of the participants was 22.14 years (SD = 5.68). In addition, eight female and eight male upper-year students volunteered to participate as raters of participants' pictures. Participants and raters signed consent forms approved by the Senate Ethics Committee (see Appendices A and B).

Procedure

Participants were involved in a testing session of approximately 45 minutes duration. Three profile pictures of their head were taken: frontal, left, and right profiles. These pictures were taken with an Epson 3000 digital camera mounted on a tripod and with a focal length of 50 cm. A blue adhesive dot was placed on the forehead and each cheek for the front, left, and right profile pictures.

The dot measuring 2 cm was used to calibrate the focal distance of the camera to the participant's head. Participants were asked to pull hair away from their face and ears, to remove any jewelry on their face or ears, and to maintain a neutral expression on their face. A full frontal, whole person picture was also taken with participants posing on a neutral coloured background in street clothing, without jackets, bulky sweaters, or shoes. Participants placed their feet on two templates spaced 30.5 cm apart at a distance of 3.25 m away from the camera.

Participants also had each hand scanned, palm down, using a black and white, 300 dpi Epson flatbed scanner. Height in meters on a measuring stick and weight in kilograms on a scale were also recorded. These measurements were used to compute BMI = kg/m^2. Participants also provided an imprint of each foot on paper using Crayola washable paint. Participants then completed a brief demographic and health questionnaire (see Appendix C). On this questionnaire, participants reported their (a) last year grade average, (b) overall physical health on a 100-point scale anchored 0 = "extremely poor" and 100 = "extremely good", and (c) history of lifetime medical diagnoses according to 15 organ systems. From the latter, a variable labeled diagnoses was created by summing all reported medical diagnsoses, excluding those resulting from transient infection or injury. More commonly reported diagnoses included heart murmer, asthma, and diabetes which are chronic in nature.

Participants then completed the following two psychometric instruments:

1. Concerns about Shape and Weight Scale (CSAW; Davis, 1993; see Appendix D). This 18-item assessment tool measures the feelings that people have about their weight and shape. Half of the items are each positively and negatively keyed. Items are scored 0-4 on a 5-point Likert scale. Total scores summed across all items range 0-72 where higher scores are indicative of higher body-

esteem. The two-week test-retest reliability for the instrument is r (65) = .94. The Cronbach's alpha is .94 amongst a sample of 136 undergraduate students. In the present study a Cronbach's alpha = .97 was obtained. Concurrent validity of the instrument was established (Davis, 1993) through its association with three subscales of the Eating Disorder Inventory (Garner & Olmsted, 1984) obtained from a sample of 220 university undergraduates (87% female): Body Dissatisfaction (r = -.84), Drive for Thinness (r = -.69), and Bulimia (r = -.49). The summative score over the three EDI subscales correlates r = .82 with the CSAW. This summative score is the same as that used by Davis et al. (2000, 2001) as the dependent measure of "weight preoccupation" in relation to observer-rated attractiveness. Finally, body-esteem as measured by the CSAW appears to be more closely associated with global self-esteem in women than in men. Among university women, the CSAW correlates r(70) = .52 ($p < .001$) with the Rosenberg Self-esteem Inventory (Rosenberg, 1979) which measures general regard for one's self-worth. Among men, the correlation is r(41) = .27, $p < .092$.

2. Shipley Institute of Living Scale (Shipley; Zachary, 1996; see Appendix E). This widely used screening instrument of general intellectual ability contains a 40-item vocabulary test and a 20-item test of abstract thinking. There is a 10-minute time limit for each of the two self-administered tests. A summary score produces an estimated full scale IQ based on the Wechsler Adult Intelligence Scale – Revised. The median correlation between the Shipley and the latter scale is .79 across 11 published studies (Zachary, 1996).

Raters. The eight female and eight male raters independently rated each of the 77 male and 76 female pictures on a 100-mm visual analog scale for attractiveness anchored 0 = "extremely poor" and 100 = "extremely good". Pictures were viewed on 43 cm Sony Trinitron monitor using the program ACDSEE v4.0 on a Pentium II 450MMX computer. Raters proceeded through the pictures

one at a time at their own pace. Raters rated all facial pictures and whole person pictures. Order of presentation of the two types of pictures was counter-balanced and, within each type of picture, randomly ordered to control for potential contrast effects. Raters were instructed to refrain from rating the picture of any participant with whom they were acquainted in order to minimize preferential effects on ratings. This occurred in 2% of all ratings with the missing data subsequently replaced by the mean of all raters for that participant.

Measurement of fluctuating asymmetry. The participant photographs of the face, ears, and hands were measured by the experimenter using Adobe Photoshop v5.5 to determine the degree of fluctuating asymmetry (FA) of 17 different bilateral traits (see Appendix F). These traits were then combined to form a single index of composite fluctuating asymmetry (CFA: Lueng, Forbes, & Houle, 2000). A higher CFA is indicative of greater departures from perfect bilateral trait symmetry.

Results

Data Screening

The data were first examined for missing values. Shipley IQ scores were unavailable for two females and six males. Grades (last year average) were not reported by 21 females and 13 males. These missing values were not replaced. The distributions of the variables were examined for univariate outliers. Age was significantly leptokurtic (skewed right) for both sexes, with two participants of each sex reporting an age > 3 SDs above the mean. Two females also reported number of lifetime medical diagnoses > 3 SDs above the mean. These two variables were subjected to a log transformation. Results of zero-order correlations between each of these two variables and all other variables remained essentially the same using transformed and untransformed data. Consequently, results reported herein are with respect to untransformed age and number of lifetime medical

diagnoses. Regarding the possibility of multivariate outliers, the decision was made to examine the scatterplots of significant zero-order correlations between variables. In only one circumstance did a variable (i.e., CFA) emerge as a multivariate outlier. The manner in which it was dealt with is outlined below.

Ratings of Attractiveness

Three indices of the attractiveness of participants were obtained from the eight female and eight male raters: facial (FA), whole person (WPA), and composite (CA: facial plus whole person) attractiveness. For each index, separate intraclass correlation coefficients were calculated to determine the degree of agreement among the raters. In a preliminary analysis, one male rater produced ratings of both male and female participants that fell below the conventional .3 criterion for minimally acceptable item-total correlation: r_s = .08 and 04 for FA and WPA, respectively. The data from that rater was subsequently removed and the resultant intraclass correlations are displayed in Table 1. The coefficients range .73 to .91 and suggest that male and female raters are in considerable agreement as to the attractiveness of same and opposite sex participants. Consequently, ratings for each participant were averaged across the 15 raters in the creation of the attractiveness variables FA, WPA, and CA.

Sex Comparisons on the Variables

Table 2 displays the variable means and standard deviations for the male and female participants. Five significant sex differences emerged according to univariate t-tests. Compared to males, females reported lower body-esteem on the CSAW. This sex difference in body image is consistent with the literature. They also reported poorer overall physical health, and lower body mass index (BMI). Finally, females were rated higher in whole person attractiveness (WPA), and they

reported a higher last year grade average compared to males.

Physical Correlates of Attractiveness

One purpose of this study was to determine whether certain physical attributes of the participants are associated with their observer-rated attractiveness. These include composite fluctuating asymmetry (CFA), body mass index (BMI), number of lifetime medical diagnoses, and overall physical health. A fifth physical attribute, age, was included for exploratory purposes in the zero-order correlational analyses.

As expected, CFA did correlate significantly with the three indices of attractiveness among females: facial (FA: $r = -.24$), whole person (WPA: $r = -.23$), and composite attractiveness (CA: $r = -.25$; see Table 3). However, examination of the respective scatterplots revealed the presence of one female multivariate outlier (see Figure 1, participant #19). Removing this participant from the analysis, as suggested by Tabachnick and Fidell (2001), resulted in reductions in the magnitude of correlations that were no longer statistically signitificant between CFA and FA ($r = -.11$), WPA ($r = -.15$), or CA ($r = -.14$). The magnitude of these same correlations was nonsignificant for males (see Table 3). Thus, contrary to the findings from previous studies (Gangestad et al., 1994, Hume & Montgomery, 2001, Scheib et al., 1999), in this study it appears that CFA is not a correlate of facial or whole person attractiveness for either sex.

Previous studies have reported an association between facial attractiveness and health status (Hume & Montegomery, 2001; Shackelford & Larsen, 1999). This was not confirmed in the present study. None of the attractiveness indices correlated with either of the two measures of health for either sex: number of lifetime medical diagnoses and overall physical health, rs range .06 to .20. Interestingly, these health indices were associated with body-esteem (CSAW) among males: $rs = -.30$

and .45, respectively. Thus, male body-esteem is related to their perceived health status and illness history. The same is not true for females.

Regarding body mass index, the fourth physical attribute of interest, BMI correlated significantly as expected (cf. Hume & Montegomery, 2001) with each of the three indices of attractiveness among both female participants (r_s = -.54 [FA], -.72 [WPA], and -.68 [CA]) and, albeit to lesser degree, among male participants (r_s = -.26 [FA], -.29 [WPA], and -.29 [CA]; see Table 3). Furthermore, the attractiveness ratings that were provided by female and male raters were similarly influenced by participants' BMI: A larger body mass was associated with lower attractiveness ratings among both male and female participants (see Table 4). These correlations suggest that one's judgement concerning another's attractiveness is influenced by the observee's body size, particularly if the person being observed is female.

The fifth physical characteristic of age also significantly correlated with indices of attractiveness among female participants (r_s range -.42 to -.50) and, again to a less extent, among male participants (r_s range -.18 to -.22; see Table 3). Given that BMI and age were each associated with attractiveness, stepwise multiple regressions were run separately for males and females to determine their relative, nonredundant contribution to the explanation of variance in composite attractiveness (CA) ratings. Body mass index was entered into the regression equation first because BMI is the more robust correlate of attractiveness. Regarding females, both variables were significant in the overall prediction, $R = .73$, $F(2, 72) = 39.77$, $p < .001$. BMI explained 47% of the variance in CA with age independently contributing an additional 5% to the explanation. Among males, only BMI was a significant predictor, explaining 8% of the variance in CA, $R = .29$, $F(1, 75) = 6.87$, $p < .02$.

Psychological Correlates of Attractiveness

A second purpose of this study was to determine the association of attractiveness with three psychological attributes: IQ, academic achievement (grades), and body-esteem (CSAW). IQ did not significantly correlate with any of the indices of attractiveness for either sex: rs range -.12 to -.19 (see Table 3). Among females, grades were significantly associated with facial (FA), whole person (WPA), and composite (CA) attractiveness: rs = .34, .31, and .35, respectively: More attractive females reported higher grades. The same correlations were nonsignificant among males: rs = .08, .05, .08, respectively. It is noteworthy that grades and IQ were themselves uncorrelated among males (r = .15) and females (r = -.02), suggesting that self-reported academic achievement has little to do with intelligence as measured by the Shipley.

Regarding body-esteem, the CSAW did indeed correlate significantly and positively among females with facial (FA), whole person (WP) and composite (CA) attractiveness: rs = .29, .37, and .35, respectively. More attractive women report greater body-esteem for their shape and weight. Such findings are completely opposite to those obtained by Davis et al. (2000, 2001). Among males, FA and CA were not associated with CSAW, but WPA was, rs = .10, .18, and .24, respectively.

Mediational Analyses

Thus far it has been established that the attractiveness of an individual is related to how they perceive their own weight and shape (CSAW). It has also been shown that attractiveness is highly associated with the person's body mass (BMI), particularly among women. Further examination of Table 3 reveals that BMI and CSAW are themselves significantly correlated among females and males: rs = -.45 and -.41, respectively. People with greater body mass feel worse about their weight and shape. The question arising from these observations is whether the significant correlation

between observer-rated attractiveness and self-reported body-esteem is mediated by body mass? The answer appears to be yes.

Figures 2 and 3 depict the mediational models tested for whole person (WPA) and facial (FA) attractiveness. According to Baron and Kenny (1986), a variable functions as a mediator when three criteria are met: (a) the independent variable (WPA or FA) correlates significantly with the presumed mediator (BMI), (b) mediator correlates significantly with the dependent variable (CSAW), and (c) the previously significant correlation between the independent and the dependent variable is no longer significant when the effects of the mediator are removed. Strongest evidence of mediation is obtained when this semi-partial correlation between attractiveness and CSAW with BMI held constant now becomes zero. The mediational analyses were conducted using multiple regression procedures where BMI was entered as the first predictor of attractiveness and then CSAW was entered after BMI was controlled for.

As can be seen in Figure 2, among females (top panel) and males (bottom), all three criteria were met regarding the mediating role of BMI in the association between whole person attractiveness (WPA) and body-esteem (CSAW). The significant zero-order correlations among females and males of $\underline{r}s$ = .37 and .24 now become nonsignificant semi-partial correlations of $\underline{r}s$ = .07 and .14 when BMI is held constant. A similar picture emerges for females when facial attractiveness (FA) is considered the independent variable in prediction of CSAW where the significant zero-order correlation of $\underline{r}$ = .29 now reduces in the semi-partial correlational analysis to $\underline{r}$ = .05 (see Figure 3, top panel). Regarding males, the third criterion for mediation was not met as the zero-order correlation between FA and CSAW was not significant to begin with (bottom panel).

Table 1

Intraclass Correlation Coefficients Among Raters for Attractiveness

	Attractiveness			
	Facial		Whole person	
Sex of rater	Female	Male	Female	Male
Female	.85	.81	.83	.79
Male	.84	.73	.85	.75
Female + Male	.91	.88	.91	.87

Note. Rater ns = 8 females and 7 males. Participant ns = 76 females and 77 males.

Table 2

Comparisons of Participants by Sex

	Males		Females			
Variable	M	SD	M	SD	df	t
FA	42.87	10.50	45.83	12.46	151	-1.59
WPA	44.75	9.82	48.55	12.64	151	-2.08*
CA	87.62	18.98	94.39	23.37	151	-1.97
BMI	25.29	3.94	23.67	4.18	151	2.47*
CFA	18.39	6.26	17.02	5.50	151	1.43
CSAW	51.99	14.17	39.60	15.87	151	5.09**
IQ	106.99	6.80	106.58	7.83	143	0.33
Grades	74.17	6.04	77.48	7.99	119	-2.51*
Diagnoses	0.42	0.64	0.62	1.01	151	-1.49
Age	22.43	6.14	21.86	5.23	151	0.62
Health	84.72	10.35	80.18	12.76	151	2.41*

Note. FA = facial attractiveness. WPA = whole person attractiveness. CA = composite attractiveness (FA + WPA). BMI = body mass index. CFA = composite fluctuating asymmetry. CSAW = Concerns about Shape and Weight Scale. IQ = estimated IQ from the Shipley Institute of Living Scale. Grades = last year average. Diagnoses = number of lifetime medical diagnoses. Health = 100-point scale rating of overall physical health.

*$p < .05$, **$p < .001$.

Table 3
Correlations Among the Variables by Sex

Variable	1	2	3	4	5	6	7	8	9	10	11
1. FA	--	.73**	.93**	-.54**	-.24*	.29*	.10	.34*	-.19	-.42**	.15
2. WPA	.74**	--	.93**	-.72**	-.23*	.37**	.09	.31*	-.13	-.50**	.20
3. CA	.94**	.93**	--	-.68**	-.25*	.35*	.10	.35*	-.17	-.49**	.19
4. BMI	-.26*	-.29*	-.29*	--	.01	-.45**	-.12	-.14	.02	.41**	-.16
5. CFA	-.10	-.05	-.08	-.12	--	-.16	-.05	-.22	.17	.10	-.27*
6. CSAW	.10	.24*	.18	-.41**	.11	--	.06	.11	-.10	-.24*	.20
7. IQ	-.14	-.12	-.14	-.13	.02	-.23*	--	.15	-.09	-.13	-.06
8. Grades	.08	.05	.08	-.05	-.16	-.10	-.02	--	-.18	-.15	.12
9. Diagnoses	.08	-.13	-.16	.23*	-.15	-.30*	.29*	.04	--	-.10	-.28*
10. Age	-.18	-.22*	-.22*	.28*	.16	-.08	.08	.00	-.04	--	-.03
11. Health	.07	.06	.07	-.11	.02	.45**	-.19	-.08	-.15	-.01	--

Note. Correlations above the diagonal are for females and below the diagonal are for males. FA = facial attractiveness. WPA = whole person attractiveness. CA = composite attractiveness (FA + WPA). BMI = body mass index. CFA = composite fluctuating asymmetry. CSAW = Concerns about Shape and Weight Scale. IQ = estimated IQ from the Shipley Institute of Living Scale. Grades = last year average. Diagnoses = number of lifetime medical diagnoses. Health = 100-point rating scale of overall physical health.
*$p < .05$, **$p < .001$.

Table 4

Correlation Between Attractiveness and Body Mass Index as a Function of Sex of Rater and Sex of Participant being Rated

	Attractiveness			
	Facial		Whole person	
Sex of rater	Female	Male	Female	Male
Female	-.41**	-.22	-.55**	-.26*
Male	-.62**	-.27*	-.78**	-.27*
Female + Male	-.54**	-.26*	-.72**	-.29*

Note. Rater ns = 8 females and 7 males. Picture ns = 76 females and 77 males. *p < .05, **p < .001.

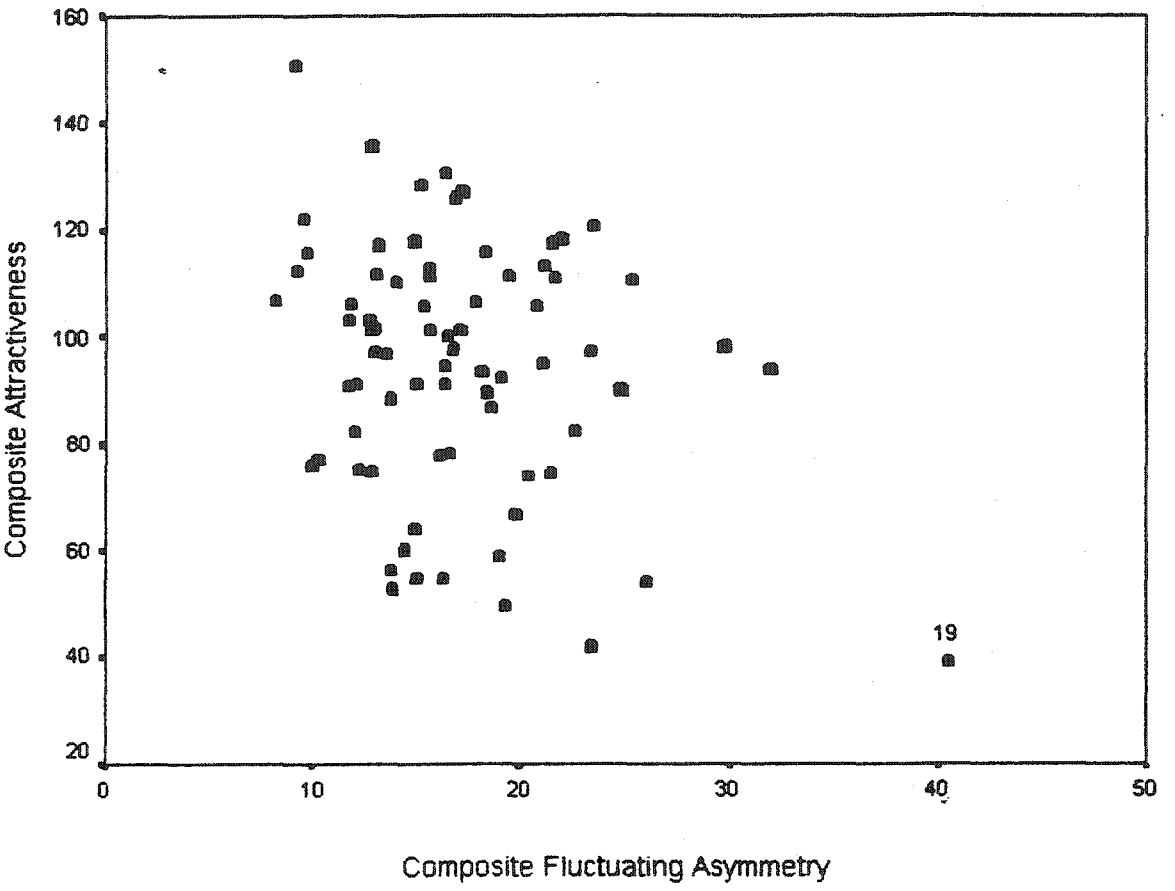
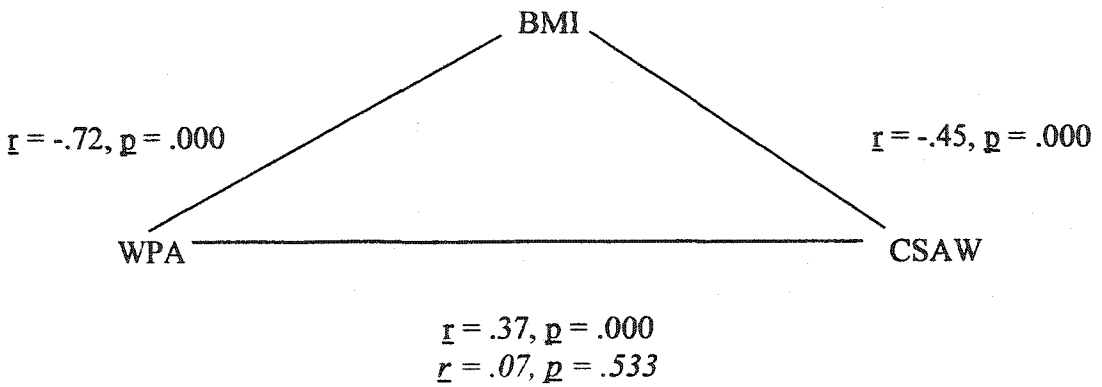


Figure 1. Fluctuating asymmetry and composite attractiveness in females.

Females



Males

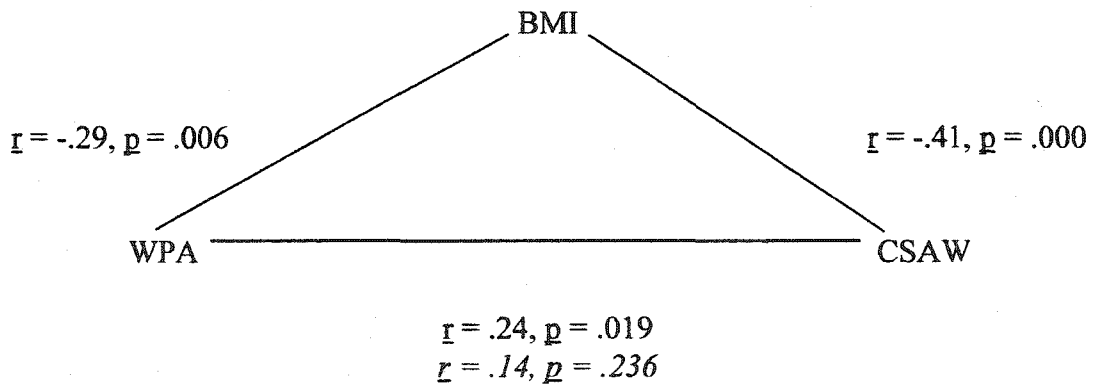
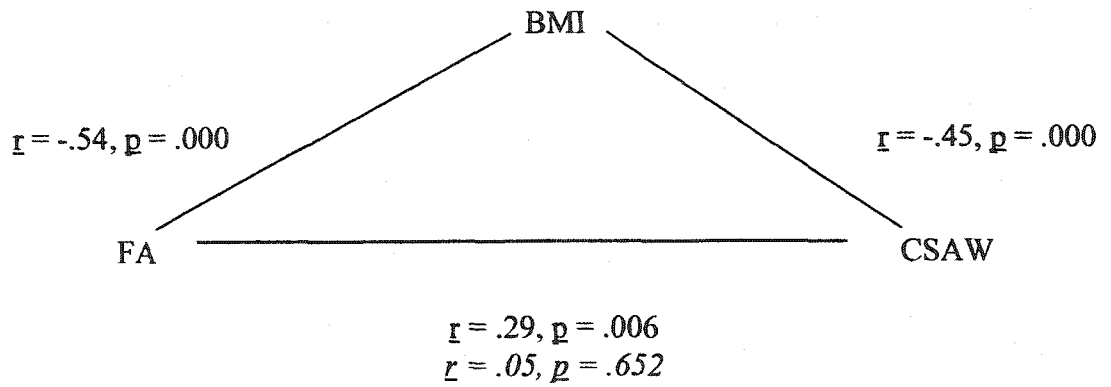


Figure 2. Zero-order correlations and p values for the relationships between whole person attractiveness (WPA), body mass index (BMI), and Concerns about Shape and Weight Scale (CSAW) among females (top panel) and males (bottom). The semi-partial correlation between WPA and CSAW when BMI is held constant is depicted in italics.

Females



Males

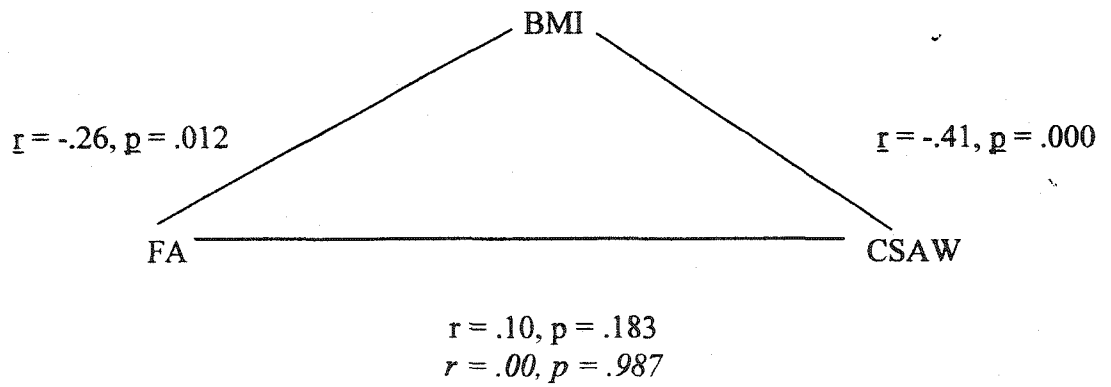


Figure 3. Zero-order correlations and p values for the relationships between facial attractiveness (FA), body mass index (BMI), and Concerns about Shape and Weight Scale (CSAW) among females (top panel) and males (bottom). The semi-partial correlation between FA and CSAW when BMI is held constant is depicted in italics.

Discussion

These findings do not replicate the Davis et al. (2000, 2001) observations that more facially attractive women have more weight and shape concerns. Therefore, the Davis et al. (2001) theoretical explanation as to why attractive women have greater weight preoccupation based upon the self-fulfilling prophecy hypothesis is not supported. They suggested that more attractive females develop the qualities that others expect of an attractive woman, and proposed that these attractive women begin to behave in the manner they feel that an attractive woman should behave that includes the pursuit of thinness. As a result of attempting to fit into society's thin ideal, these women could develop weight and diet concerns. The opposing theory is that of symbolic interactionism.

Symbolic interactionism as a theory appears a greater fit to the findings at hand. It proposes that our self-perceptions are formed as a result of how we think we are perceived by others. This theory would predict that more attractive individuals according to face and whole person pictures would report less (not more) weight and shape concerns. In the present study, those females rated as more attractive reported better body-esteem. The same was true for whole person attractiveness in males. Therefore, these results are consistent with symbolic interactionist theory. More specifically, Cooley's (1902) idea of the looking glass self provides means to understand the obtained associations.

To recapitulate, the looking glass self consists of three components: a) how you view yourself (self-appraisals), b) how you think others view you (reflected appraisals), and c) how others actually view you (actual appraisals). All three components of the model are necessary for the development of an individual's self-concept. One's self-perception is based upon how one

thinks others perceive him/her. In other words, the influence of others' appraisals on our own self-appraisals is mediated by reflected appraisals (how we think others view us). Empirical evidence supports this model (Felson, 1989; O'Connor & Dyce, 1993; Schafer & Keith, 1985). As previously discussed, individuals do not demonstrate much accuracy in correctly perceiving the appraisals of specific significant others. Rather, individuals can accurately determine how others in general perceive them. This is otherwise known as Mead's (1934) concept of the generalized other (Felson, 1989; O'Connor & Dyce, 1993; Shrauger & Schoeneman, 1979). This research suggests that it is the actual appraisals of others in general that is more important in determining one's self-concept, rather than those of specific significant others.

A related explanation for the observed relationship between body-esteem and attractiveness is Lerner's (1987) "circular functions" hypothesis. This hypothesis states that one's appearance leads to responses from others which, in turn, influence the person's own sense of physical attractiveness. It is through this interpersonal feedback mechanism that a relationship between body image and physical attractiveness develops.

This study provides additional support for the looking glass self model. The actual appraisals (objective attractiveness ratings) of others influence our self-appraisals (body-esteem). This influence of objective attractiveness ratings on body-esteem is mediated by BMI. Therefore, when others in general are judging our level of attractiveness, they use BMI as an important factor in a determination of their rating. Also, when an individual evaluates their own body image, BMI again figures into that determination. When we interpret feedback from others (reflected appraisals), we obtain the message that BMI is an important determinant of

attractiveness, and we internalize this information when determining our own self-appraisal of our level of attractiveness.

There are many ways that this message can be sent. People may tell you directly (expressions given) that your BMI (or your weight) plays a role in your level of attractiveness. Feedback, be it positively or negatively valenced, has a clear impact on body image. This feedback does not even have to be verbalized. Subtle nonverbal cues can send a message about one's attractiveness. Direct feedback like weight or shape teasing is an example of how one can be told directly about the relationship between attractiveness and body weight. In fact, frequency of teasing in childhood and adolescence predicts an increase in body dissatisfaction in adulthood (Cattarin & Thompson, 1994). Garner (1997) found that 44% of women and 35% of men admit that teasing was an important factor in their body image. Furthermore, 36% of teasing experiences have been focused on weight, and the majority of this teasing is received from peers (Rieves & Cash, 1996).

It is perhaps more likely that others would unintentionally (expressions given off) send you a message about your BMI and its relation to attractiveness (O'Connor & Dyce, 1993). This indirect feedback can occur quite frequently. This is when we see people evaluate other individuals and thereby indirectly get feedback about how we are viewed by others (Schrauger & Schoeneman, 1979). For example, if your friend called someone "fat" and you compared your size to that person's and found that they are quite similar, your friend would be indirectly telling you that you are "fat."

Another important influence to consider is that of social comparison. First of all, there are objective standards for comparison when it comes to weight. The acceptable range of BMI is

clearly defined in height and weight charts. However, research shows that even with objective standards, we compare ourselves with others (Marsh & Parker, 1994). Upward comparisons, when we compare ourselves to others that are superior to us on a specific trait, are especially deleterious to self-esteem (Major, Testa, & Bylsma, 1991). The more an individual makes upward comparisons of oneself to others, the greater the body dissatisfaction will likely be.

The media plays a strong role in sending the message that BMI is related to attractiveness. Constantly, magazines and television send the message that "what is beautiful is thin." Sociocultural theory emphasizes the role that society plays in the development of body dissatisfaction. Garner (1997) found that 23% of women admit that movies have influenced their body image, while 22% state that fashion models have affected their body image. In comparison, for males, 13% admitted that movies influenced their body image, while only 6% found that fashion models affected their body image (Garner, 1997). Women are continually comparing themselves with unrealistic images seen in the media. As a result, women report that their ideal body would be 5' 7", 100 pounds, a size 5, with long blond hair, and blue eyes (Nichter & Nichter, 1991). This "ideal" body translates into a BMI of less than 16 is compared to that among people with the eating disorder of anorexia nervosa. Therefore, women idealize a body shape that is indeed low in BMI.

With all of these routes of transmission, it is not surprising when evaluating our own body-esteem that our BMI plays a role in our self-appraisals. This study replicates the finding that BMI is correlated with attractiveness for males and particularly so for females (Maisey et al., 1999; R. Davis et al., 2000; Tovee et al., 1999; Tovee et al., 1998). There are possible explanations for why BMI plays a more influential role in attractiveness for women. For males,

research suggests that waist-to-chest ratio could be an even more important determinant of attractiveness than BMI (Maisey et al., 1999). For women, there is a lot of societal pressure to be thin. Women are expected to be attractive and western culture seems to emphasize beauty as an important indication of female worth. Other significant traits like intelligence, being caring, generosity, identity formation, and independence are de-emphasized relative to the attainment of thinness. On the other hand, for men, there is an emphasis on financial capability. Men are expected to have successful careers and to be able to provide financially for the family (Singh, 1995).

In the present study an interesting finding emerged demonstrating that men with better body-esteem tend to rate themselves as having better overall health. This suggests that for men, they view their bodies positively when they are healthy. For women, as we have discussed, they value thinness over health. Furthermore, the level of thinness that women pursue is often lies in an unhealthy weight range. This could explain why in this study, there was no relationship between body-esteem and overall health rating for women. These results suggest that men idealize health and fitness for their bodies while women idealize thinness.

The present findings stand in contrast to the Davis et al. (2000, 2001) observations who found that more facially attractive females reported greater weight preoccupation. However, there are some important differences between this study and the Davis et al. (2000, 2001) studies. The C. Davis et al. (2000) study relied upon only one judge for determining objective attractiveness. In the Davis et al. (2001) study there were only 4 male and 4 female judges. In the present study, 8 female and 7 male raters were utilized. More raters increase the reliability of the aggregated attractiveness indices. In addition, whole person attractiveness was also

investigated in the present study. Davis et al. (2000, 2001) only examined facial attractiveness as an index of participants' overall attractiveness. In reality, when we determine how attractive a person is, we see their whole person and not just their face. Another possible explanation for the different results is that weight preoccupation was measured differently in the Davis et al. (2001; 2000) studies than in this study. This study utilized the Concerns about Shape and Weight Scale while their studies used the Drive for Thinness, Body Dissatisfaction, and Bulimia subscales of the Eating Disorder Inventory. These different measures could be measuring different aspects of body-esteem. The Davis et al. (2000, 2001) studies may have actually measured disordered eating and related behaviours (i.e. Bulimia subscale of the EDI) rather than body-esteem alone (i.e. Drive for Thinness and Body Dissatisfaction subscales). Perhaps more attractive females tend to engage in more disordered eating behaviours to maintain the body size with which they are satisfied.

Surprisingly, fluctuating asymmetry was not correlated in the present study with attractiveness for males or for females, where in the latter circumstance, one female outlier was removed. These results do not replicate the Hume and Montgomerie (2001) findings that fluctuating asymmetry is correlated with facial attractiveness. However, in the present study fingerprints, ankles, elbows, or wrists were not measured as they were in Hume and Montgomerie. This could be why our present results do not replicate their results. However, this study and the results of Hume and Montgomerie (2001) suggest that FA is a weak correlate of attractiveness at best. By contrast, both studies found that BMI is by far the more influential physical attribute associated with attractiveness.

In this study, IQ was unrelated to attractiveness in either sex. Academic achievement was positively associated with attractiveness among females but not males. This provides partial replication for the association between achievement and attractiveness among children (Zahr, 1985). One important observation is that the two constructs were uncorrelated in the present study, suggesting that academic achievement has little to do with intelligence as it was operationalized using the Shipley IQ. It is also important to note that academic achievement in the present study was determined upon the participants' self-reports of last year grade average. The veridicality of such reports must be determined in future research by obtaining objective evidence of grades. Assuming that the self-reports are indeed accurate, one must speculate why attractiveness and academic achievement are related. Perhaps this is due to assortative mating, where more attractive females select more financially stable males (males that would likely have higher university averages). Over multiple generations, these two traits could then become associated by this mechanism. Also, there was a highly attenuated range of IQ scores in the sample as all participants were university students. This could also explain why intelligence and attractiveness were not correlated in this study.

There are, of course, certain limitations to the present study. The participants were all university students and of a homogenous, young age. Nevertheless, age was negatively correlated with attractiveness in both sexes. Future research should include greater representation across the life span to determine if this association holds. Also, the sample consisted mostly of Caucasian individuals. Greater cultural variability would be more desirable. There are numerous ways of measuring FA, and perhaps the best method was not used. More bilateral traits could have been measured to ensure that any relationship between asymmetry and

attractiveness would be revealed. Ideally, this study should have utilized more measures of body esteem and included the method of weight preoccupation as operationalized by Davis et al. (2000, 2001). It is important to point out that the CSAW correlates $r = .82$ with the weight preoccupation measure, suggesting that the two indices are tapping the construct of body image. Finally, regarding IQ, the present sample had a restricted range of scores. A greater range would be more desirable.

Future research should attempt to replicate the BMI mediational results obtained in this study. Cross-cultural comparisons could be made to see if the same relationship holds across cultures. Finally, all three segments of the looking glass self (objective attractiveness, self-rated attractiveness, and reflected appraisals [general compared to specific]) should be examined in a future study. This study could further prove that the looking glass self is involved in forming our self-perceptions regarding attractiveness.

This study also has social implications. In the media, we need more emphasis on other valued traits for women and men. The media needs to begin focusing on traits like intelligence, independence, generosity, and identity formation for both males and females. Also, interventions in the schools could teach children about the effects that weight-related teasing has on others. Finally, families need to realize that their behaviours influence their children and that their behaviours towards body weight and shape are modeled by their children.

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Appendix A

Consent Form for Participants

My signature on this sheet indicates that I agree to participate in a study assessing body symmetry and body perception. The study is being conducted by Christy Vogen in the Department of Psychology for her Master's thesis under the supervision of Dr. Ron Davis (343-8646). Today I will have pictures of myself taken, and I will provide a footprint and handscan. I will also complete a few questionnaires regarding body image and health history and a cognitive task. At a later date your pictures will be evaluated by anonymous raters for body symmetry, physical traits, and psychological traits.

Signing this form indicates that I understand the following:

I am a volunteer and can withdraw at any time from the study without penalty.

There are no physical or psychological risks associated with participation.

The data I provide will remain confidential, and be securely stored in the Department of Psychology at Lakehead University for seven years.

I may receive a summary of the project, upon request, following the completion of the study.

My name will be put into three $50 lottery draws to occur upon completion of the study.

I have received explanations about the nature of the study, its purpose, and procedures.

_____ _____

Name of Participant (please print) Signature of Participant

_____ _____

Student Number Name of Professor for Psych 100 bonus mark

Appendix B

Consent Form for Raters

My signature on this sheet indicates that I agree to participate in a study about my impressions of anonymous people in photographs. This research is for Christy Vogen's psychology MA thesis conducted under the supervision of Dr. Ron Davis (343-8646). I understand the following:

1. I am a volunteer and can withdraw from the study at any time.
2. There is no apparent risk of physical or psychological harm.
3. The data I provide is confidential and will be held in the Department of Psychology for seven years.
4. Upon request, I may receive a summary of the overall findings of the study when it is available.

Print Name:_____

Signature of Participant:_____

Date:_____

Appendix C

1. How old are you?:_____years.
2. What is your gender?:_____female, _____male.
3. What was your last year course average?:_____%, And the year before that?:_____%
4. Please list any confirmed medical diagnoses that your Doctor has said you have suffered from at any point in your life related to (state the diagnosis):
5. Heart:_____;Kidney_____;Lungs_____
6. Liver:_____;Pancreas:_____;Brain_____
7. Bones:_____;Ears_____;Eyes_____
8. Bowels:_____;Stomach:_____;Skin_____
9. Hormones:_____;Blood_____;Immune System:_____
10. Any other diagnoses not covered above?
    _____
11. How would your overall physical health on a scale from 0 (extremely poor health) to 100 (extremely good health):_____rating.
12. What is your ideal weight?:_____pounds, And your ideal height?:_____inches.

Appendix D

CSAW

Instructions: This is a scale that measures a variety of personal feelings that you have about your own body weight and shape. THERE ARE NO RIGHT OR WRONG ANSWERS SO TRY VERY HARD TO BE COMPLETELY HONEST IN YOU ANSWERS. Read each statement carefully. For each statement circle the response that best represents your feeling.

SD = Strongly Disagree
D = Disagree
N = Neutral
A = Agree
SA = Strongly Agree

1.	I feel insecure about my weight or shape.	SD	D	N	A	SA
2.	I feel great about my weight or shape.	SD	D	N	A	SA
3.	I feel negative about my weight or shape.	SD	D	N	A	SA
4.	I feel humiliated about my weight or shape.	SD	D	N	A	SA
5.	I feel unhappy about my weight or shape.	SD	D	N	A	SA
6.	I feel comfortable about my weight or shape.	SD	D	N	A	SA
7.	I feel dissatisfied about my weight or shape.	SD	D	N	A	SA
8.	I feel secure about my weight or shape.	SD	D	N	A	SA
9.	I feel terrible about my weight or shape.	SD	D	N	A	SA
10.	I feel proud about my weight or shape.	SD	D	N	A	SA
11.	I feel bad about my weight or shape.	SD	D	N	A	SA
12.	I feel happy about my weight or shape.	SD	D	N	A	SA
13.	I feel satisfied about my weight or shape.	SD	D	N	A	SA
14.	I feel nervous about my weight or shape.	SD	D	N	A	SA
15.	I feel uncomfortable about my weight or shape.	SD	D	N	A	SA
16.	I feel relaxed about my weight or shape.	SD	D	N	A	SA
17.	I feel good about my weight or shape.	SD	D	N	A	SA
18.	I feel positive about my weight or shape.	SD	D	N	A	SA

Appendix E

SHIPLEY INSTITUTE OF LIVING SCALE

Administration Form

Walter C. Shipley, Ph.D.

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Name: _____ Sex: M F Age: _____

Education: _____ Usual Occupation: _____ Today's Date: _____

Part I

Instructions: In the test below, the first word in each line is printed in capital letters. Opposite it are four other words. Circle the *one word* which means the *same thing*, or most nearly the same thing, as the first word. If you don't know, guess. Be sure to circle the *one word* in each line that means the same thing as the first word.

EXAMPLE:

LARGE	red	(big)	silent	wet

(1)	TALK	draw	eat	speak	sleep
(2)	PERMIT	allow	sew	cut	drive
(3)	PARDON	forgive	pound	divide	tell
(4)	COUCH	pin	eraser	sofa	glass
(5)	REMEMBER	swim	recall	number	defy
(6)	TUMBLE	drink	dress	fall	think
(7)	HIDEOUS	silvery	tilted	young	dreadful
(8)	CORDIAL	swift	muddy	leafy	hearty
(9)	EVIDENT	green	obvious	skeptical	afraid
(10)	IMPOSTOR	conductor	officer	book	pretender
(11)	MERIT	deserve	distrust	fight	separate
(12)	FASCINATE	welcome	fix	stir	enchant
(13)	INDICATE	defy	excite	signify	bicker
(14)	IGNORANT	red	sharp	uninformed	precise
(15)	FORTIFY	submerge	strengthen	vent	deaden
(16)	RENOWN	length	head	fame	loyalty
(17)	NARRATE	yield	buy	associate	tell
(18)	MASSIVE	bright	large	speedy	low
(19)	HILARITY	laughter	speed	grace	malice
(20)	SMIRCHED	stolen	pointed	remade	soiled
(21)	SQUANDER	tease	belittle	cut	waste
(22)	CAPTION	drum	ballast	heading	ape
(23)	FACILITATE	help	turn	strip	bewilder
(24)	JOCOSE	humorous	paltry	fervid	plain
(25)	APPRISE	reduce	strew	inform	delight
(26)	RUE	eat	lament	dominate	cure
(27)	DENIZEN	senator	inhabitant	fish	atom
(28)	DIVEST	dispossess	intrude	rally	pledge
(29)	AMULET	charm	orphan	dingo	pond
(30)	INEXORABLE	untidy	involatile	rigid	sparse
(31)	SERRATED	dried	notched	armed	blunt
(32)	LISSOM	moldy	loose	supple	convex
(33)	MOLLIFY	mitigate	direct	pertain	abuse
(34)	PLAGIARIZE	appropriate	intend	revoke	maintain
(35)	ORIFICE	brush	hole	building	lute
(36)	QUERULOUS	maniacal	curious	devout	complaining
(37)	PARIAH	outcast	priest	lentil	locker
(38)	ABET	waken	ensue	incite	placate
(39)	TEMERITY	rashness	timidity	desire	kindness
(40)	PRISTINE	vain	sound	first	level

Turn over this sheet and continue with Part II when instructed to do so.

W-177A 6 7 8 9 Printed in U.S.A.

Part II

Instructions: Complete the following by filling in either a number or a letter for each dash (____). Do the items in order, but don't spend too much time on any one item.

EXAMPLE: A B C D E

(1) 1 2 3 4 5 __

(2) white black short long down __ __

(3) AB BC CD D __

(4) Z Y X W V U __

(5) 1 2 3 2 1 2 3 4 3 2 3 4 5 4 3 4 5 6 __ __

(6) NE/SW SE/NW E/W N/ __

(7) escape scape cape __ __ __

(8) oh ho rat tar mood __ __ __ __

(9) A Z B Y C X D __

(10) tot tot bard drab 537 __ __ __

(11) mist is wasp as pint in tone __ __

(12) 57326 73265 32657 26573 __ __ __ __ __

(13) knit in spud up both to stay __ __

(14) Scotland landscape scapegoat __ __ __ __ ee

(15) surgeon 1234567 snore 17635 rogue __ __ __ __ __

(16) tam tan rib rid rat raw hip __ __ __

(17) tar pitch throw saloon bar rod fee tip end plank __ __ __ __ __ meals

(18) 3124 82 73 154 46 13__

(19) lag leg pen pin big bog rob __ __ __

(20) two w four r one o three __

DO NOT WRITE IN THIS AREA

Summary Scores

V: Raw ____ *T* ____ A: Raw ____ *T* ____ Total: Raw ____ *T* ____

CQ: ____ AQ: ____ Est. *IQ*: ____

____

Abstraction raw score ____

Appendix F

Method of Measurement for 17 traits of Fluctuating Asymmetry (FA)

Trait	Method of measurement
FA: face x 7	The front view picture of the face was first aligned in Adobe Photoshop v5.5 such that the angle of the line between the interpupillary distance was set to 0°. A measuring template was then superimposed over the picture such that measurements were made at identical reference points on the faces for all participants. These reference points were identical to those reported by Grammer and Thornhill (1994) and Hume and Montgomerie (2001) with inclusion of one additional reference point. Reference lines were drawn between the points located at the left and right of each face as follows: outer eye, inner eye, cheek width, nose width, mouth width, and 2 chin widths. The size of each of the 7 facial traits was calculated in pixels in relation to the plane of symmetry, defined as the mean of the midpoints for all traits. All measurements were corrected for focal distance by dividing the measure by the width of the calibrating dot on the cheek.
FA: digit x 4	The length of digits 2, 3, 4, and 5 on each hand was determined by measuring the distance in pixels from the middle of the finger at the lowest visible crease to the furthest point at the end of the digit.
FA: foot x 2	The left and right foot imprints were measured by ruler to the nearest mm at 2 locations: (1) the distance from the heal to the tip of the 1st digit (big toe), and (2) the distance from the heal to the tip of the 2nd digit.
FA: ear x 4	Each left and right side view picture of the face was first aligned such that the angle of the line between the tip of the nose and the outer part of the inner ear was set to 0°. Measurement 1 was the distance in pixels from the outer part of the inner ear to the outer part of the outer ear where the angle of the line was maintained at zero. Measurement 2 was the distance from the outer part of the inner ear to the lowest part of the outer ear where the angle of the line was maintained at -90°. Measurement 3 was the distance from the outer part of the inner ear to the highest part of the outer ear. Measurement 4 was the maximum length from the lowest to the highest part of the outer ear. All measurements were corrected for focal distance by dividing the measure by the width (or length) of the calibrating dot.
Composite FA (CFA)	FAs for each of the 17 traits were calculated by the absolute difference between left (L) and right (R) measurements divided by the mean measurement of the left and right sides for each participant: Trait FA = |R - L|/[(R + L) x 0.5] (Palmer & Strobeck, 1986). The distributions of each trait FA were standardized into z scores. Individual trait FAs were then summed for each participant to produce a single index of composite fluctuating asymmetry (CFA: Leung, Forbes, & Houle, 2000).