Perception of Attractiveness and Weight of Women's Faces and Bodies
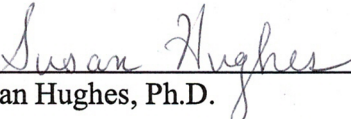
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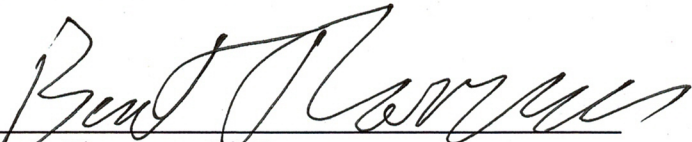Submitted in partial fulfilment of the requirements for

College Honors

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Perception of Attractiveness and Weight of Women's Faces and Bodies

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Abstract

This study examined the perception of faces versus bodies of heavier-set women when seen separately or together. For the first part of this investigation, participants were administered online surveys and asked to rate the weight and attractiveness of women when cropped for face only, body only, or full face and body. Overall, ratings of attractiveness for cropped faces were greater than cropped bodies and whole face/body images. There were no differences between male and female raters for facial attractiveness, however, men judged the cropped body photos and whole body images as being less attractive than did women. For the second part of this study, participants' eye fixations were tracked using noninvasive eye tracker equipment to view full body images and then were asked to rate the women's overall attractiveness. There was a difference between male and female fixation on images, whereby males looked at bodies more often than faces and women looked at faces more often than bodies. There was a difference between fixation of bodies and faces, whereby participants looked at the bodies of women with larger faces more often than the faces. These findings are explained using an evolutionary psychology standpoint.

Perception of Attractiveness and Weight of Women's Faces and Bodies

In the United States, the weight of an average adult woman is 166.2 pounds with a height of 5 feet 4 inches (Centers for Disease Control and Prevention, 2016). According to the United States Department of Health and Human Services, the average American woman has a body mass index of 28.5, which falls under the classification of being overweight. Most studies that examine women's attractiveness do so by examining normal weight individuals. This study aimed to examine perceptions of women who have weights that represent more of the norm of Western society. Specifically, we examined the perception of women's faces versus bodies when seen separately or together when considering women with a heavier-set weight and who have different face relative to body fat proportions.

Facial Attractiveness

Several features of a woman's face relate to the perception of attractiveness. Some observable cues that have been linked to female beauty are having full lips, clear skin, and clear eyes (Buss & Schmitt, 1993). Women who exhibit facial symmetry are also rated as more attractive (Scheib, Gangestad, & Thornhill, 1999). Symmetry is a heritable trait and a cue of developmental stability, which suggests that the woman has good genetic quality (Thornhill & Grammer, 1999). Men also rate women as being more attractive if they have certain sexually dimorphic traits in their face that signal femininity, such as high cheekbones, a thin jaw, a lack of brow ridge over the eyes, and a larger gap between the eye and eyebrow (Penton-Voak, Jones, Little, Baker, Tiddeman, Burt, & Perrett (2001). Short bone structures in the face are brought on by a lack of testosterone and an increase of estrogen in women (Thornhill & Gangestad, 1999). As such, women with higher ratios of estradiol and progesterone are also rated high in facial attractiveness (Wang, Hahn, Fisher, DeBruine, & Jones, 2014). Women who have neotenous

facial traits, such as large eyes, a small nose, and large lips, are rated as more attractive than women with average traits (Jones & Hill, 1993) presumably because these traits are a sign of a woman's youth and greater reproductive potential (Jones, Brace, Jankowiak, Laland, Musselman, Langlois, Roggman, Pérusse, Schweder, & Symons, 1995).

Facial fat also seems to be important when it comes to rating attractiveness. Women with lower levels of adipose (fatty) tissue in the face are rated as more attractive (Coetzee, Perrett, & Stephen, 2009). Adipose tissue in the face may be a signal of overall health of an individual (Coetzee et al. 2009; Thornhill & Grammer, 1999). Women with more adipose tissue in their face may be rated as less attractive because as women grow older, excess fatty tissue develops in pockets within the face (Coleman & Grover, 2006). Therefore, from an evolutionary perspective, perhaps men do not find women with larger faces attractive because the adipose tissue mimics the process of aging, which suggests that the woman is no longer fertile. Adipose tissue also develops when a woman has been pregnant for fourteen weeks (Poissonnet, Burdi, & Bookstein, 1983). Therefore, a man who sees a woman with a rounder face may perceive her as already being impregnated by another man and may not find her as attractive.

Body Attractiveness

In addition to facial attractiveness, a woman's body attractiveness may also reveal a woman's reproductive viability. For example, men have a preference for women with toned muscles (Choi, 2003). A toned body may advertise that a woman has a healthy lifestyle, regularly exercises, and maintains a good diet despite the temptations of the abundance of fatty and sugary foods available in Western societies (Choi, 2003). Symmetry of bilateral body features are also rated to be being more attractive than those features that are asymmetrical because it is sign of developmental stability (Thornhill & Grammar, 1999).

A woman's waist-to-hip ratio (WHR) is also another indicator of reproductive potential and health. Men tend to find women who have a 0.7 WHR ("hourglass" shape) to be the most attractive (Singh, 1993). Assessing the WHR of a woman is a nearly universal trait in the male mate selection process (Singh, 1993; Singh 1994; Singh & Singh, 2011). Women who have fat deposits on their hips, buttocks, and thighs have low risk to health problems and are more capable of producing offspring (Singh & Singh, 2011). Singh and Singh (2006) concluded that WHR and BMI are independent of each other such that a woman can have a high BMI, but still have a low WHR.

Body weight and body shape also relate to one another to influence perceptions of attractiveness. For instance, women who are particularly slender and have a larger WHR are often portrayed as being younger, but not as being attractive, while women who have a normal weight and have a lower WHR were rated as more attractive (Singh, 1994). Women who are underweight or overweight and have a WHR of 0.7 are still seen as attractive (Schutzwohl, 2004). Women who veer away from this ideal WHR and have an "apple" shaped body with pronounced fat distribution in their upper body (android region) are at higher risk for hyperandrogynism, non-insulin dependent diabetes mellitus (Type II diabetes), gallbladder disease, carcinomas, hypertension, heart disease, and stroke (Singh, 1993). Women with a "pear" shaped body who have more fat distribution on their lower body (gynoid region) are at a higher risk for sex binding globulin, a moderate risk for insulin resistance, and a lower risk for hyperandrogynism, Type II diabetes, gallbladder disease, carcinomas, hypertension, heart disease, and stroke (Singh, 1993).

Generally, people tend to rate others with a higher body mass index (BMI) as less attractive than those with lower BMI (Faries & Bartholomew, 2012; Legenbauer, Vocks,

Schäfer, Schütt-Strömel, Hiller, Wagner, & Vögele, 2009). In particular, men had rated thinner traits of women as more attractive than larger traits of women (Beck, Ward-Hull, & McLear, 1976). While listing desirable traits of mates on dating websites, men listed thinness in a woman as an attractive quality significantly more than had women listed thinness in men (Smith, Waldorf, & Trembath, 1990). Moreover, men tend to rate a woman's weight as a high importance when making the decision of whether or not to kiss her (Hughes, Harrison, & Gallup, 2007).

Culture seems to play a role on men's perceptions of female weight and attractiveness. Individuals from varying populations rated overweight women differently from one another (Swami, Caprariom, Tovée, & Furnham, 2006). Caucasian Americans, rather than African Americans, Hispanic Americans, and Asian Americans, tend to rate thinness as one of the more important factors of physical appearance. African Americans rated thinness to be one of the least important factors when listing desirable physical traits (Altabe, 1998). Men tend to rate heavier women as more attractive when there are little resources available in the society, while men tend to rate heavier women as less attractive when there is an abundance of available resources (Wetsman & Marlowe, 1999). Therefore, women with higher levels of body fat in societies with scarce fatty foods and other resources may seem more reproductively fit (Singh & Singh, 2011).

In order to become fertile and reach menarche, women need to have a certain amount of body fat distributed throughout the body (Frisch & McArthur, 1974). The excess fatty tissue is then stored as a resource for pregnancy. Women in societies in which have low levels of food resources are rated as more attractive if they tend to have a higher BMI and a woman who has access to good nutrition may cue to a man that she is capable of carrying out a pregnancy (Singh & Singh, 2011). For example, men from the Hadza tribe in Tanzania thought BMI of a woman

was more important for determining attractiveness than WHR. Women who had a lower WHR were seen as unattractive when compared to other women with a higher WHR. Since the Hadza are a hunter-gatherer society, they do not have access to rich nutrients. Therefore, Hadza men tend to find overweight females more attractive because they appear to be adaptable to the environment in finding food (Wetsman & Marlowe, 1999).

Excess body fat in a woman may mimic pregnancy. Women who are heavier may appear that they have been impregnated because of excess fat in the stomach area, which could decrease their overall attractiveness rating (Gallup & Frederick, 2010). Since women tend to develop more fat during pregnancy, men may assume that a woman is pregnant if she exhibits extra fat and will not be interested in her (Poissonnet et al., 1983).

There are several reasons why men may not find overweight women attractive. First, women with higher amounts of body fat may stop ovulating or experience menopause earlier in life than those women with lower amounts of body fat (Frisch, 1984), therefore, they may not be ideal reproductive mates. Second, body size is a sexually dimorphic trait whereby men tend to be larger and more physically dominant. Women who have higher levels of fat present may appear larger and manlier, and not possessing ideal gender-specific traits. Women who are bulkier, especially female body builders, may appear as being competitive, aggressive, and dominant, and are, therefore rated as less attractive by men for those reasons (Choi, 2003). Last, body fat may be viewed as unattractive because it is related to certain health risks (Singh, 1993). Therefore, women with more fat distribution around the stomach may be seen as less attractive because their reproductive potential is at risk. The only exception is in societies where food resources are scarce and having a higher BMI is a sign of good nutrition (Wetsman & Marlowe, 1999).

Nevertheless, there are some men called "fat admirers" who have rated overweight and obese women more attractive than underweight and normal weight women. Fat admirers are often overweight or have a fetish with feeding women (Swami & Tovée, 2006). Although there are few studies documenting the existence of men who are "fat admirers", it appears to be more common in recent times due to the increase of the average weight of women. Higher quantities of body fat around the hips may enhance the appearance of wideness and having wider hips are beneficial during pregnancy because a wider birth canal does lesser damage to the baby's head during birth. Larger women may not necessarily have wider hip structures, but may deceive men into believing that they do (Caro & Sellen, 1990; Low, Alexander, & Noonan, 1987).

Eye Gaze

One way to assess attractiveness is to examine a person's eye gaze when viewing others. People tend to pay more visual attention to faces or people that they find physically attractive because it activates the dopamine central reward systems in the brain (Kampe, Frith, Dolan, & Frith, 2001). Armann and Bülthoff (2009) found that when examining a woman's face, women tend to fixate on the woman's eyes while men tend to fixate on the woman's cheeks and outline of the face. This pattern of fixation suggests that men are actively accessing the weight and shape of a female's physical appearance. Although both men and women have shown to first focus their gaze on a person's face rather than body to assess their overall attractiveness, men tend to focus more on a woman's body when accessing a mate for a short-term relationship (Currie & Little, 2009). Men who were primed with a short-term mating scenario showed a fixation on a female's waist and hip region, whereas men who were primed with a long-term mating scenario showed a fixation on the face (Lu & Chang, 2012). Similarly, other studies have confirmed that men tend to pay attention more to a woman's body attractiveness rather than her face when

assessing her as a short-term copulatory partner (Confer, Perilloux, & Buss, 2010). Other studies

have shown that men showed a preference of looking at bodies before faces, even if the faces

were more attractive than the bodies (Gervais, Holland, & Dodd, 2013; Wagstaff, Sulikowski, &

Burke, 2015).

When men were asked to view images of women's bodies, they tend to display a fixed

eye gaze pattern starting at a woman's waist and ending at their upper torso (Cornelissen,

Hancock, Kiviniemi, George, & Tovée, 2009). Men tend to look at the outline of the body in a

vertical pattern starting at the hips and ending at the waist, and doing so may show that they are

assessing WHR. Men have shown to look more at the stomach and have a horizontal fixation

pattern instead of one being vertical, perhaps to assess body fat distribution. If the woman is

overweight, the man will fixate longer on the stomach instead of other regions (Cornelissen et

al., 2009). Therefore, if a woman has a larger BMI, a man may pay more attention to her body

rather than her face.

Current Study

This study examined the perception of women's faces versus bodies when seen separately

or together and when considering women who were of a heavier set weight. We examined both

perceived attractiveness and perceived weight of women as well the eye gaze patterns of a

viewer seeing images of the full body and face of these women. First, we predicted that

attractiveness ratings for both women's faces and bodies would be positively correlated with

perceived ratings of weight when shown as only cropped faces, cropped bodies, or shown as the

full face/body image. Secondly, we predicted that a thin face would positively influence

attractive ratings. Specifically, we hypothesized that when faces were rated as being thinner than

a woman's body, faces will be rated as being more attractive when the picture was cropped and

presented alone than when presented with the full body, whereas the body will be rated as less

attractive when seen alone than when seen as a full body image. As a comparison, women with

equal facial and body fat proportions were also shown individually as a cropped face or body and

as a full body, and we did not expect to find a difference in attractiveness ratings for those

ratings.

We also hypothesized that participants who are given images of women with congruent

levels of higher fat distributed in the face and body will pay more attention to the face than the

body (as measured from eye tracking equipment), since previous findings have shown that

people attend more to faces than bodies in general (Confer et al., 2010). However, when we

present women with thinner faces and heavier bodies, we expected viewers' eye gaze to shift and

focus more on the body because viewers tend to focus on things that are unusual or distinct to

make sense of the information (Waddill & McDaniel, 1998). Thus, viewers may try to make

sense of a woman having thin facial cues, but a larger body. Lastly, we predicted that men will

fixate on bodies more often than women and women will fixate on faces more often than men.

Past literature has shown that men tend to fixate on bodies rather than faces (Gervais et al., 2013)

and women tend to fixate on faces rather than bodies (Wagstaff et al., 2015).

Study 1

Method

Participation in the study was voluntary and participants could receive extra credit in

their psychology classes for their participation in this study at the discretion of their professors.

All procedures were approved by the local Institutional Review Board.

Participants

For the first study, there were 312 participants (245 women and 67 men) who responded to an anonymous online survey. Participants were undergraduate student solicited from the Psychology Department Participation Pool at Albright College via email messages alerting them of this survey. The mean age of participants was 20.1 (*SD* = 1.62, range 18-26). The majority of the participants reported being Caucasian (63.5%), followed by African American (18.9%), Hispanic/Latino (8.3%), Asian/Pacific Islander (5.1%), and other (4.2%). Since we were examining opposite-sex attractiveness ratings as it relates to mating strategies, we only included those who indicated a preference for members of the opposite sex and excluded 33 participants (21 women,11 men) due to their reported non-heterosexual orientation. Of the participants, 46.5% indicated that they were currently in an exclusive, committed, romantic relationship and 53.5% indicated that they were not. Most of the participants who had indicated that they were currently in an exclusive, committed, romantic relationship indicated that they had been in the relationship for 1-2 years (35.2%), followed by 3-4 years (22.8%), 6-11 months (17.2%), 1-5 months (15.2%), 5 years or more (7.6%), and less than one month (2.1%). The participants were also asked to select one of three body shapes that they thought best represented their own body configuration from three figure drawings; 25.7% reported having an ectomorphic body shape, 46.5%, mesomorphic body shape, and 27.6% had an endomorphic body shape.

Materials and Procedure

The first study was administered as an online, anonymous survey using the software program, *SurveyMonkey*. First, participants gave their informed consent. Then participants were asked demographic questions regarding their gender, age, ethnicity, sexual orientation, whether or not they were in a current exclusive, committed, romantic relationship, how long they had been in their current relationship, and asked to identify their body shape as reported above.

Participants were then presented with 30 pictures of women that were of heavier set weight obtained from open-access sites on the internet and were cropped in size and shape in order to be standardized. The women were wearing bathing suits, undergarments, or very form-fitting clothing so that their body shape was not concealed. We attempted to have a mix of women who had thin faces and larger bodies ($n = 15$) and women with larger faces and larger bodies ($n = 15$), however, our selection of whether our stimuli accurately represented these categories would later be confirmed by the ratings of perceived facial and body fat made by our participants (see below). All respondents viewed the same 30 women, however, respondents were divided into three groups and had only seen all pictures that were only cropped faces ($n = 106$), only cropped bodies ($n = 107$), or only full body (both face and body) ($n = 99$) images, thus employing a between-subject design for the type of stimuli. The order in which the pictures were presented was counterbalanced by the survey software.

Beneath each picture, participants were asked to make ratings on a 10-point scale (1 = very unattractive, 5 = average looking, 10 = very attractive) to assess how attractive they thought the woman was. Then all 30 pictures were presented again, but participants were asked to rate the weight of each person on a 7-point scale (1 = thin/below normal weight, 2 = normal weight, 3 = slightly overweight, 4 = moderately overweight, 5 = slightly obese, 6 = moderately obese, 7 = extremely obese). We also counterbalanced whether participants first rated all pictures for attractiveness or perceived weight.

We calculated a difference score between the perceived facial and body fat, and divided participants by using a median split for women who had thinner faces relative to their bodies ($n = 15$) versus those who had more congruent rating for facial and body fat ($n = 15$).

At the conclusion of the survey, participants were debriefed about the purpose of the study and were linked to a separate survey to complete information in order to gain extra credit for their classes that did not link their data to this information.

Results

Several Pearson correlations were conducted to examine the relationship between male and female ratings of attractiveness and perceptions of weight for faces, bodies, and whole images. As face weight decreased, face attractiveness ratings increased when made by male raters, $r(29) = -.85$, $p < .001$ and female raters, $r(29) = -.62$, $p < .001$. Similarly, as body weight decreased, body attractiveness ratings increased when made by male raters, $r(29) = -.65$, $p < .001$ and female raters, $r(29) = -.54$, $p < .002$. When body face and body images were presented together, as perceptions of weight decreased, attractiveness ratings increased when made by male raters, $r(29) = -.78$, $p < .001$ and female raters, $r(29) = -.73$, $p < .001$.

A 3 (stimuli type) X 2 (rater sex) X 2(facial weight) mixed model ANOVA was used to examine attractiveness ratings. There was no main effect for facial weight group, $F(1, 28) = 4.01$, $p < .055$, $\eta^2 = .125$. However, there was a main effect for stimuli type, $F(2, 56) = 19.12$, $p < .001$, $\eta^2 = .406$, whereby participants rated cropped faces as being the most attractive ($M = 5.46$, $SE = .13$), followed by the full images, ($M = 5.20$, $SE = .10$) and rated the bodies to be the least attractive ($M = 4.90$, $SE = .13$) with all pairwise comparisons being significantly different from one another. There was also a main effect for rater sex, $F(1, 28) = 67.27$, $p < .001$, $\eta^2 = .706$, whereby female raters gave overall higher attractiveness ratings ($M = 5.50$, $SE = .10$) than did male raters ($M = 4.86$, $SE = .14$). There was a significant two-way interaction between stimuli type and facial weight group, $F(2, 56) = 9.84$, $p < .001$, $\eta^2 = .260$. To examine this interaction further, data was split by facial weight and One-Way ANOVAs were performed. For women

with thin faces relative to their bodies, participants rated both their cropped face pictures (M = 5.82, SE = 0.18) and whole face and body pictures (M = 5.77, SE = 0.18) as being significantly more attractive than their cropped body pictures, (M = 5.03, SE = 0.14), $F(2, 28)$ = 18.49, p < .001, η^2 = .569. For women with both larger faces and bodies, participants rated their whole body (M = 5.44, SE = 0.15) as significantly more attractive than both their cropped face (M = 5.11, SE = 0.14) or cropped body alone (M = 4.97, SE = 0.17), $F(2, 28)$ = 7.72, p < .002, η^2 = .355.

There was also a significant two-way interaction between stimuli type and the rater sex, $F(2, 56)$ = 83.20, p < .001, η^2 = .748. To further examine this interaction, post hoc t-tests showed that there were no sex differences for attractiveness ratings of cropped faces, $t(29)$ = .19, p = .850. However, there was a sex difference for attractiveness ratings of cropped bodies $t(29)$ = 4.99, p < .001, whereby female raters (M = 5.11, SE = .12) rated bodies as being more attractive than male raters (M = 4.69, SE = .15). Likewise, female raters rated whole face/body images (M = 5.93, SE = .11) as more attractive than had male raters (M = 4.46, SE =.12), $t(29)$ = 18.04, p < .001.

Study 2

Method

Participants

For the second study, a separate set of 33 (21 women and 12 men) undergraduate students from the same institution had participated. The mean age of these participants was 20.9 (SD = 1.62, range 18-26). The majority of the participants reported being Caucasian (48.4%), followed by Hispanic or Latino (22.6%), African American (19.4%), and Asian or Pacific Islander (9.7%). Since we were examining opposite sex attractiveness ratings as it relates to mating strategies, we only included those who indicated a preference for members of the opposite sex, and we had

excluded 2 female participants from our analyses as a result. Of the participants, 51.6% indicated

that they were currently in an exclusive, committed, romantic relationship and 48.4% indicated

that they were not. Most of the participants who had indicated that they were currently in an

exclusive, committed, romantic relationship indicated that they had been in the relationship for

1-2 years (31.3%), 3-5 years (25.0%), 1-5 months (18.8%), 6-11 months (12/5%), and more than

5 years (12.5%). The participants were also asked to select one of three body shapes that best

represented their own body configuration from three figure drawings; 32.3% indicated having an

ectomorphic body shape, 38.7% had a mesomorphic body shape, and 29.0% had an endomorphic

body shape.

Materials and Procedure

After giving informed consent, participants were asked to complete a brief demographic

questionnaire regarding their gender, age, ethnicity, sexual orientation, whether or not they were

in a current exclusive, committed, romantic relationship, how long they had been in the current

relationship, and their body shape as reported above. Then participants were asked to sit in front

of eye tracking software program, *Tobii v. 3.3.2 T60 Eye Tracker*, in the laboratory and were told

that their eye gaze would be tracked while viewing images of different women.

Participants viewed the same 30 pictures of women as used in Study 1, but were only

presented with the full body and face images of the women while the eye tracking equipment

tracked their fixation patterns. Using the eye tracking software, we created two areas of interest

(AOI), one for the face region, and one for the body region. We recorded 6 measures using the

software: time to first fixation (how long it took in seconds before the participant fixated on an

AOI), first fixation duration (duration of the first fixation on an AOI), total fixation duration

(total time for all fixations within an AOI), fixation count (number of times fixated on an AOI),

total visit duration (total duration of fixations within an AOI), and visit count (number of visits

within an active AOI). The order in which the pictures were presented was counterbalanced by

the eye tracking software program.

   After viewing all 30 images where their eye gaze was being tracked, participants viewed

the same full body images once more using the presentation software, *SuperLab 5.0*, but this

time were asked to rate the women's overall attractiveness on 10-point scales (1 = very

unattractive, 10 = very attractive). The order of the presentation of these pictures was also

counterbalanced by the software program.

Results

   A 2 (area of interest) X 2 (rater sex) X (facial weight) mixed model ANOVA was used to

examine time to first fixation. There was no main effect for facial weight group, $F(1, 27) = .98$, p

$= .332$, $\eta^2 = .035$. There was a main effect for area of interest, $F(1, 27) = 12.35$, $p < .002$, $\eta^2 =$

.314 whereby participants looked at faces first ($M = .65$, $SE = .03$) and bodies second ($M = .85$,

$SE = .05$). There was also a main effect for rater sex, $F(1, 27) = 11.59$, $p < .002$, $\eta^2 = .300$,

whereby male raters took less time to first fixate on images ($M = .65$, $SE = .05$) than did female

raters ($M = .85$, $SE = .03$). There was a significant two-way interaction between area of interest

and the rater sex, $F(1, 27) = 4.47$, $p < .038$, $\eta^2 = .149$ (see Figure 1). Post hoc *t*-tests showed that

there were no sex differences when first fixating was on faces, $t(28) = -1.54$, $p = .136$. However,

there was a sex difference for time to first fixation on bodies, $t(29) = -3.52$, $p < .001$, whereby

male raters looked at bodies first ($M = .74$, $SD = .07$) faster than did female raters ($M = .98$, $SD =$

.05)

   A 2 (area of interest) X 2 (rater sex) X (facial weight) mixed model ANOVA was used to

examine first fixation duration time. There was no main effect for facial weight group, $F(1, 27) =$

.74, $p = .398$, $\eta^2 = .027$. There was no main effect for rater sex, $F(1, 27) = 2.81$, $p = .105$, $\eta^2 = .094$. There was a main effect for area of interest, $F(1, 27) = 158.59$, $p < .001$, $\eta^2 = .855$, whereby participants looked at faces at first for a longer duration ($M = .46$, $SE = .02$) than they did for bodies ($M = .19$, $SE = .01$). There were no significant interactions for this measure.

A 2 (area of interest) X 2 (rater sex) X (facial weight) mixed model ANOVA was used to examine total fixation duration. There was no main effect for facial weight group, $F(1, 27) = .07$, $p = .796$, $\eta^2 = .003$. There was no main effect for rater sex, $F(1, 27) = 3.98$, $p = .056$, $\eta^2 = .128$. However, there was a main effect for area of interest, $F(1, 27) = 65.48$, $p < .001$, $\eta^2 = .708$, whereby participants fixated on faces ($M = 2.84$, $SE = .03$) longer than bodies ($M = 2.30$, $SE = .05$). There was also a significant two-way interaction between area of interest and the rater sex, $F(1, 27) = 18.89$, $p < .002$ $\eta^2 = .412$ (see Figure 2). Post hoc t-tests showed male raters fixated on bodies ($M = 2.39$, $SD = .07$) longer than did female raters ($M = 2.20$, $SD = .05$), $t(29) = 2.71$, $p < .011$. On the other hand, female raters fixated longer on faces ($M = 3.01$, $SD = .04$) than did male raters ($M = 2.68$, $SD = .05$).

A 2 (area of interest) X 2 (rater sex) X (facial weight) mixed model ANOVA was used to examine fixation count. There was no main effect for facial weight group, $F(1, 27) = .98$, $p = .332$, $\eta^2 = .036$. There was a main effect for area of interest, $F(1, 27) = 117.33$, $p < .001$, $\eta^2 = .813$, whereby participants looked at bodies ($M = 9.21$, $SE = .18$) more often than faces ($M = 6.75$, $SE = .10$). There was also a main effect for rater sex, $F(1, 27) = 42.38$, $p < .001$, $\eta^2 = .611$, whereby female raters looked at the face and body areas of interest ($M = 8.31$, $SE = .08$) more often than did male raters ($M = 7.65$, $SE = .12$). There was a significant two-way interaction between area of interest and rater sex, $F(1, 27) = 39.81$, $p < .001$, $\eta^2 = .596$ (see Figure 3). Post hoc t-tests showed that there were no sex differences for how often males ($M = 7.65$, $SD = .12$)

and females ($M = 8.31$, $SD = .08$), looked at bodies. $t(29) = 1.39$, $p = .175$. However, female raters had a greater fixation count for the faces ($M = 7.57$, $SD = .14$) than male raters ($M = 5.93$, $SD = .11$), $t(29) = 10.06$, $p < .001$,

A 2 (area of interest) X 2 (rater sex) X (facial weight) mixed model ANOVA was used to examine total visit duration. There was no main effect for facial weight group, $F(1, 27) = .68$, $p = .417$, $\eta^2 = .025$. There was a main effect for area of interest, $F(1, 27) = 9.37$, $p < .005$, $\eta^2 = .258$, whereby participants looked at faces ($M = 3.21$, $SE = .04$) longer than bodies ($M = 2.96$, $SE = .05$). There was also a main effect for rater sex, $F(1, 27) = 5.58$, $p < .026$, $\eta^2 = .171$, whereby female raters looked at both face and body areas of interest for each visit ($M = 3.13$, $SE = .02$) longer than did male raters ($M = 3.04$, $SE = .04$). There was a significant two-way interaction between area of interest and rater sex, $F(1, 27) = 33.51$, $p < .001$, $\eta^2 = .554$ (see Figure 4). Post hoc t-tests showed that male raters had a longer total visit duration for bodies ($M = 3.10$, $SD = .09$) than did female raters ($M = 2.79$, $SD = .05$), $t(29) = 3.11$, $p < .004$. On the other hand, female raters had a greater total visit duration time for the faces ($M = 3.47$, $SD = .04$) than did male raters ($M = 2.95$, $SD = .06$), $t(28) = -7.86$, $p < .001$.

A 2 (area of interest) X 2 (rater sex) X (facial weight) mixed model ANOVA was used to examine visit count. There was no main effect for facial weight group, $F(1, 27) = .25$, $p = .62$, $\eta^2 = .009$. There was a main effect for stimuli type, $F(1, 27) = 36.19$, $p < .001$, $\eta^2 = .573$, whereby participants looked at bodies ($M = 2.42$, $SE = .03$) more often than faces ($M = 2.26$, $SE = .03$). There was also a main effect for rater sex, $F(1, 27) = 9.67$, $p < .004$, $\eta^2 = .264$, whereby male raters had more visit counts back and forth from face to body ($M = 2.43$, $SE = .05$) than had female raters ($M = 2.25$, $SE = .03$). There was a significant two-way interaction between area of interest and facial weight, $F(1, 27) = 7.72$, $p < .010$, $\eta^2 = .222$ (see Figure 5). Post hoc t-tests

showed that for women with perceived thinner faces relative to their bodies, participants had not

viewed the faces ($M = 2.27$, $SD = .04$) more than the bodies ($M = 2.32$, $SD = .03$), $t(13) = 1.06$, p

$= .310$. However, for images with larger faces that matched their perceived body face,

participants looked at the bodies of women with larger faces ($M = 3.38$, $SD = .04$) more often

than the faces ($M = 2.22$, $SD = .04$), $t(14) = 5.38$, $p < .001$, There was also a significant two-way

interaction between area of interest and the rater sex, $F(1, 27) = 21.19$, $p < .001$, $\eta^2 = .440$ (see

Figure 6). Post hoc t-tests showed that for faces, male raters ($M = 2.28$, $SD = .04$) did not visit

their face more than female raters ($M = 2.25$, $SD = .04$), $t(28) = .58$, $p = .570$. However, male

raters looked at bodies ($M = 2.58$, $SD = .06$) more often than did female raters ($M = 2.25$, $SD =$

$.03$), $t(29) = 4.74$, $p < .001$.

Several Pearson correlations were conducted to examine the relationships between the

eye gaze measures taken and male and female ratings of attractiveness for whole images. There

were no significant relationships between attractiveness ratings and eye gaze patterns among

female raters. However, for male raters, when attractiveness ratings increased, males looked at

faces longer during the first fixation, $r(15) = .41$, $p < .028$.

Similar to the results in Study 1, an independent t-test showed that female raters gave

higher overall attractiveness ratings of images ($M = 5.59$, $SD = 0.82$) than did male raters ($M =$

4.68, $SD = 1.27$), $t(29) = 5.83$, $p < .001$.

Discussion

Regardless of whether the images of the heavier-set women were cropped faces, cropped

bodies, or whole body/face images, the lower their perceived weight, the more attractive they

were rated by both men and women. This finding is consistent with many previous studies that

have also found that both men and women preferred thinner women over heavier women (Faries

& Bartholomew, 2012; Legenbauer et al., 2009). Moreover, participants rated both the cropped faces and cropped bodies of women with thin faces relative to their bodies as being significantly more attractive than their cropped body pictures. For women with both larger faces and bodies, participants rated their whole images more attractive than both their face and body cropped images. According to Coetzee et al. (2009), women with thinner faces are rated as more attractive than women with larger faces. Therefore, our finding of higher attractiveness ratings for thin faces supports the idea that people tend to favor faces that are low in fatty adipose tissue.

Although our hypothesis was not supported in regards to finding differences of women with thinner and larger faces relative to their bodies, we found some interesting sex differences. While male and female raters did not show any differences in ratings of facial attractiveness, women gave overall higher attractiveness ratings than did men. In particular, women rated cropped bodies and whole images as being more attractive than did men. Schutzwohl (2004) found that male participants favored images of thin women instead of images of overweight women. Given that all the female images used in both studies were of plus-sized women, it is not surprising that male raters gave lower attractiveness ratings than women. According to Caro and Sellen (1990) and Low et al. (1987), women with higher BMIs exhibit extra fat in both their breasts and buttocks, which may confuse men of their natural sizes. Although men prefer larger breasts and buttocks in women (Dagnino, Navajas, & Sigman, 2012), men may find overweight women less attractive because they cannot tell if the larger breasts and buttocks are a result of a larger BMI or a result of their natural body shape.

According to Fink, Klappauf, Brewer, and Shackelford (2014), women may pay more attention to the physical characteristics of rival females and rate them as more attractive. Women are often threatened by sexual characteristics of other women, such as breasts, buttocks, and

WHR (Fink et al., 2014). Since the images of heavier-set women had extenuated breasts and buttocks, intrasexual competition could have provoked female raters to give them higher attractiveness ratings.

We found that our participants looked at faces first and for a longer period of time than they did for bodies. This finding is similar to that of Currie and Little (2009) and Wagstaff et al. (2015), who found that individuals tend to look at faces first when given a choice between face and body. People may instinctually look at the faces of novel individuals first because faces can provide considerable information regarding identification, recognition between species, and telling of age (Little, Jones, & DeBruine, 2011). Faces also give insight about overall physical attractiveness (Thornhill & Gangestad, 1999) and femininity/masculinity (Penton-Voak et al., 2001). However, participants looked back to view bodies more often than they did for faces. Secondary sex characteristics, such as breasts and buttocks, are generally viewed more often because they are predictors of reproductive potential (Grammer, Fink, Moller, & Thornhill, 2003). Individuals are also capable of quickly identifying whether a body is masculine or feminine just by looking at body shape (Singh, 1993). In this study, it is possible people were quickly assessing overall features of the body, but not spending a lot of time doing so.

Male raters took less time to fixate on bodies than did female raters. Men are typically aroused/attracted to visual sexual stimuli (Ellis & Symons, 1990). In addition, Hamann, Herman, Nolan, and Wallen (2004) found that the amygdala and hypothalamus of men becomes more stimulated while viewing erotic pictures of women. Therefore, it makes sense that the male raters quickly averted their gaze onto female bodies instead of faces. Confer et al. (2010) and Waddill and McDaniel (1998) also found a sex difference between men and women while viewing images of women. They found that women tend to fixate more on faces whereas men tend to

fixate more on bodies. We found that men examined the bodies of women more often than women and women viewed faces more often than men. Gervais et al. (2013) and Lu and Chang (2012) performed similar studies using eye tracker equipment. They found that male participants were looking at the bodies of women more often than their faces when given a short-term mating scenario. Since most male college students are not currently seeking out a long-term relationship, our finding of them examining bodies more than faces supports past literature involving short-term mating scenarios and fixations on bodies.

While viewing images of larger faces that matched their larger bodies women, participants looked at the bodies more often than faces. This was not the case for women with thinner faces and larger bodies, which refuted our hypothesis. Vartanian (2010) found that normal weight individuals often view overweight people with disgust. Since people tend to turn away from disgusting stimuli (Joffe, 2008), our finding of raters ignoring the faces of larger face women is supported. Participants may have been uncomfortable looking at heavier faces and felt more at ease while fixating on the bodies. Moreover, participants did not view the faces of thinner face women more often than their bodies. People tend to remember and focus on stimuli that is unusual or comply with the norm (Waddill & McDaniel, 1998). Therefore, the participants may have been looking back and forth between the face and body of thinner face women in order to make sense of the unusual pairing.

There were several limitations and confounds that could have affected these results. All images of women were of heavier-set, plus-sized models found on open-access websites. Since pictures were all of models, the attractiveness ratings may have been positively biased. The pictures were also of only white women, and lack of diversity in ethnicity may have affected ratings. We are also not sure if our category for thin face/larger body and larger face/larger body

was truly representative of those categories because we classified these divisions based upon a

median split of weight perception ratings. Other features, such as waist-to-hip ratio and body

shape, were not controlled, even though they have shown to have an impact on the perception of

body attractiveness (Singh, 1993; Singh 1994; Singh & Singh, 2011). The position of how the

women were standing in the images their amount of make-up worn, type of hairstyle, and facial

expression were not controlled for in this study. Furthermore, the clothing associated with the

images of women was not consistent; some women were wearing undergarments, while others

were form-fitting wearing dresses. Future studies should utilize pictures of women wearing the

same clothing such as a tight-fitting leotard. Future investigations could also attempt to gather

cross-cultural data of attractiveness ratings of overweight women.

  Male raters gave overall lower attractiveness ratings of the images of overweight women.

The cropped faces of those women whose faces were smaller in relation to their bodies were

rated significantly more attractive than whole images and cropped body images. This suggests

that BMI is an important contributing factor for determining a potential mate's attractiveness.

The results of this study support previous investigations regarding perceptions of the weight and

attractiveness of women. We found that men tend to look at women's bodies more often and for

longer than faces. According to Buss, Larsen, and Semmelroth (1992), men tend to seek out

sexual information, whereas women seek out emotional information. Our sex difference in

fixation suggests that men may be seeking information about the reproductive potential of mates

based on sexual secondary characteristics. Women, on the other hand, are more interested in

looking at faces, which portray meaningful expressive information. The sex differences found in

our study support predictions regarding mate attraction and mate selection processes based on

evolutionary theory.

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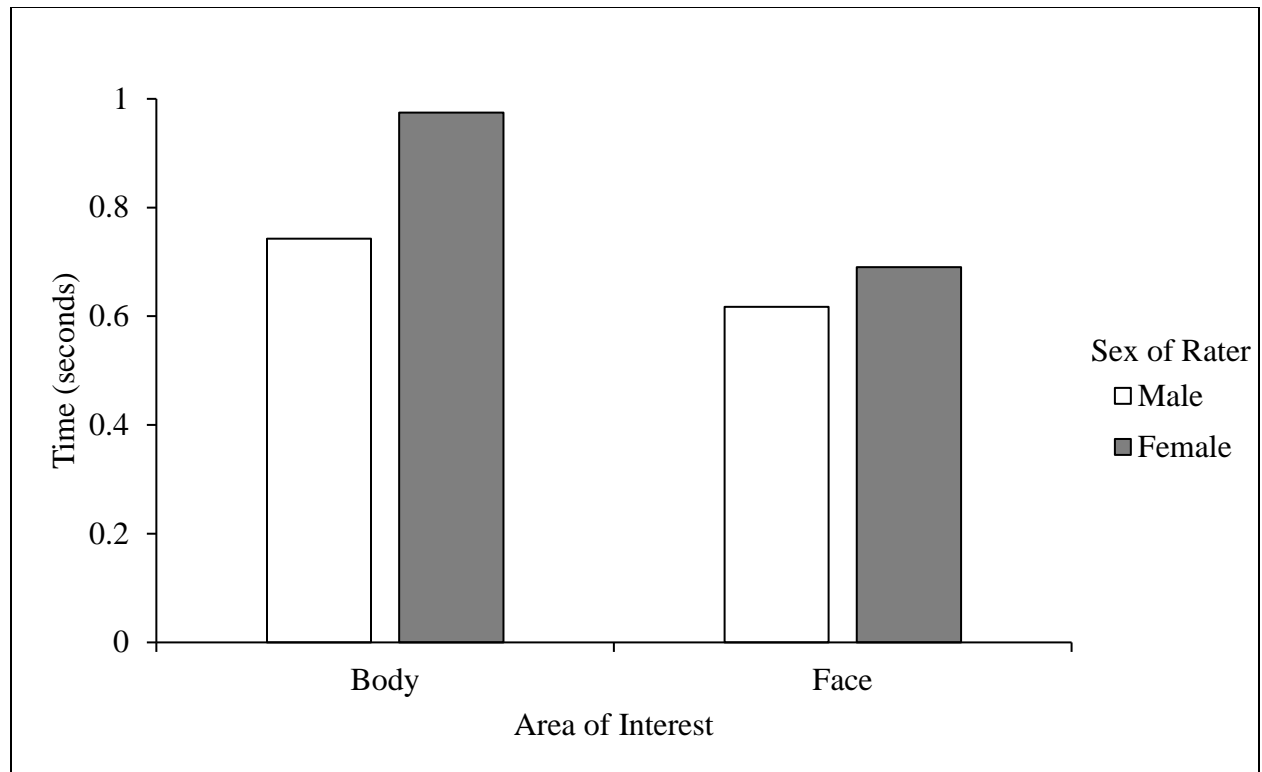
Figure 1. Significant interaction between area of interest and rater sex for time to first fixation.
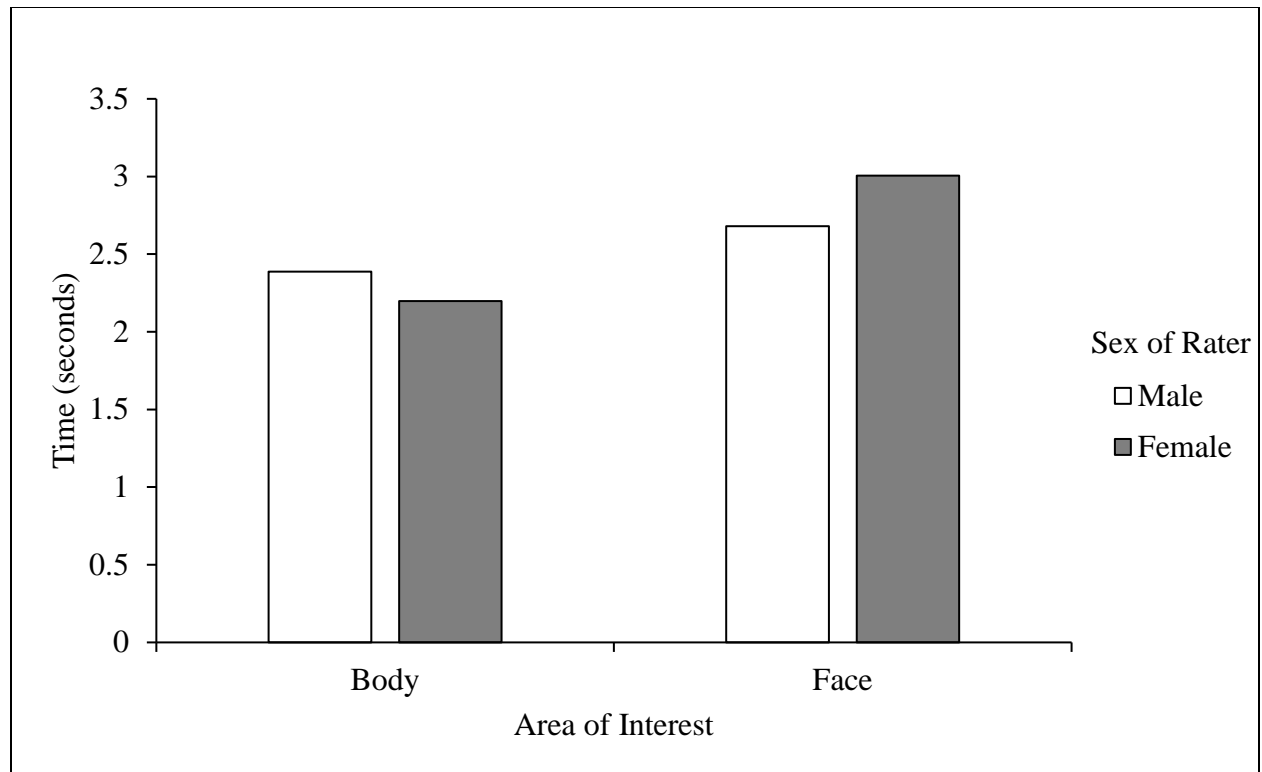
Figure 2. Significant interaction between area of interest and rater sex for total fixation duration.
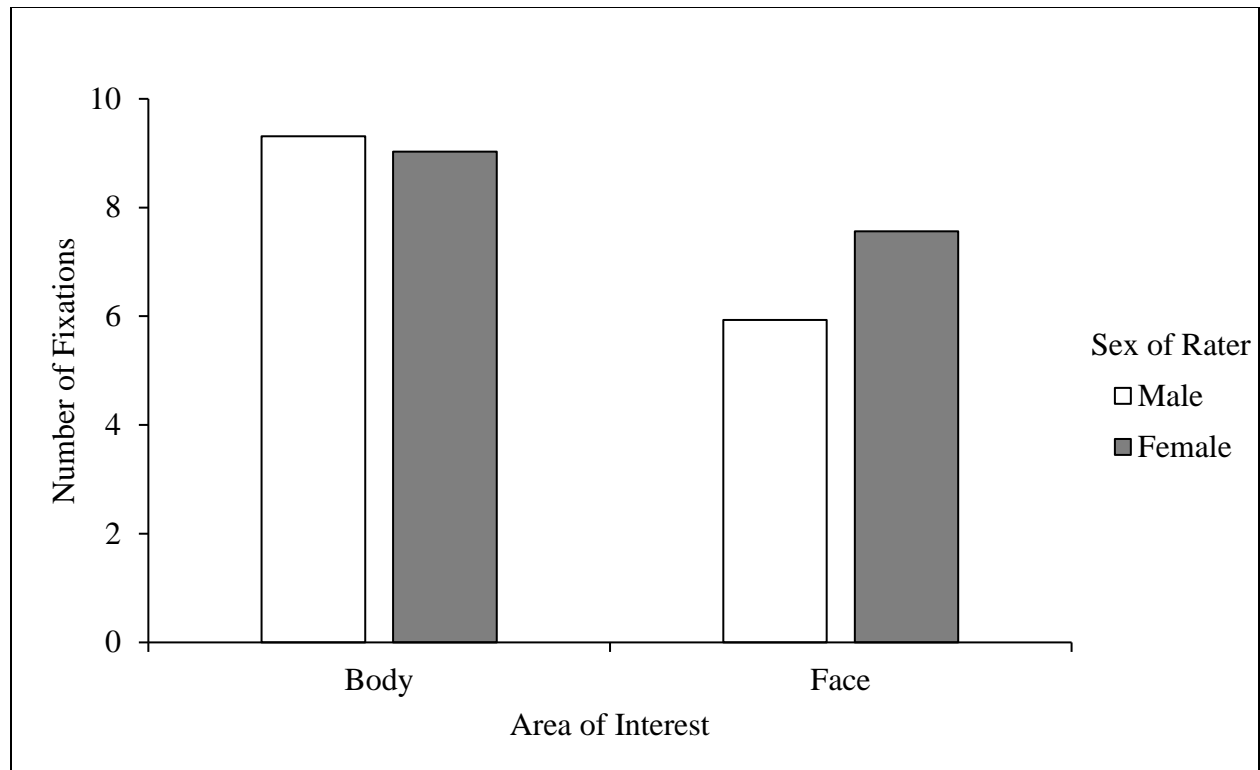
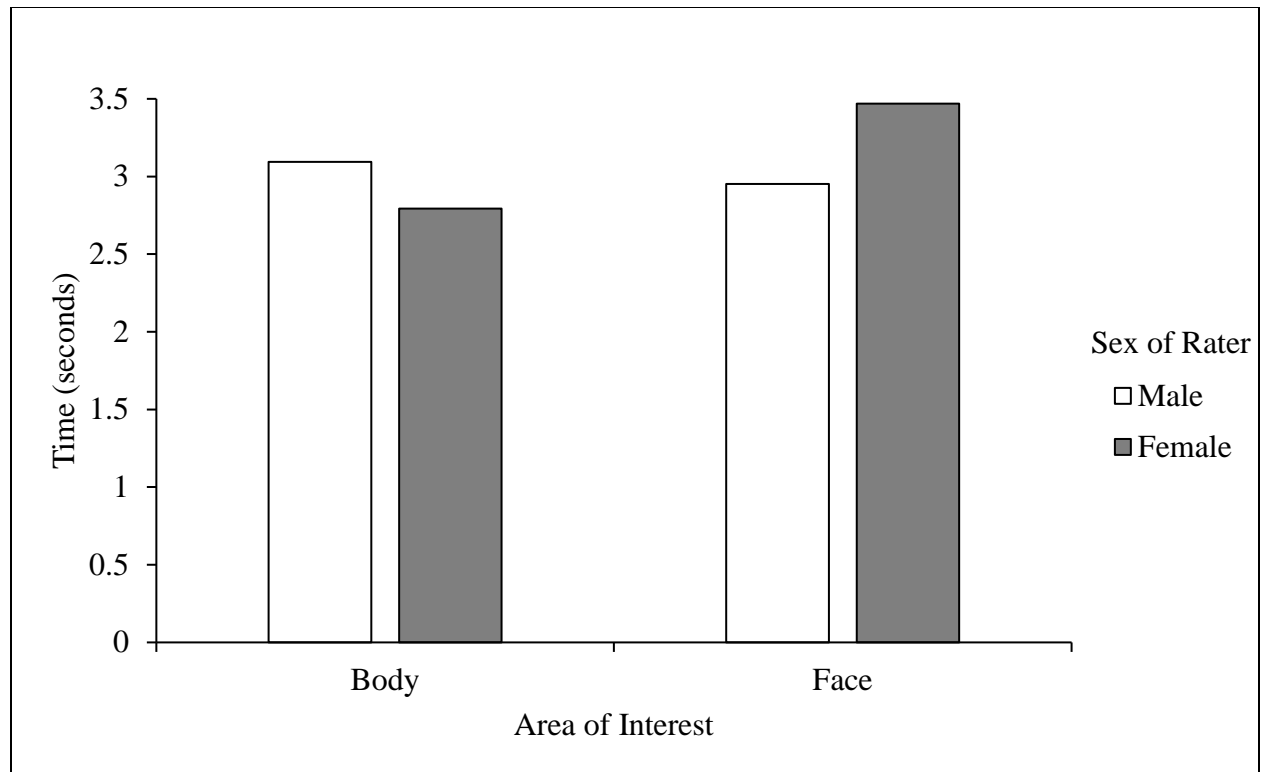*Figure 3*. Significant interaction between area of interest and rater sex for fixation count.

Figure 4. Significant interaction between area of interest and rater sex for total visit duration.

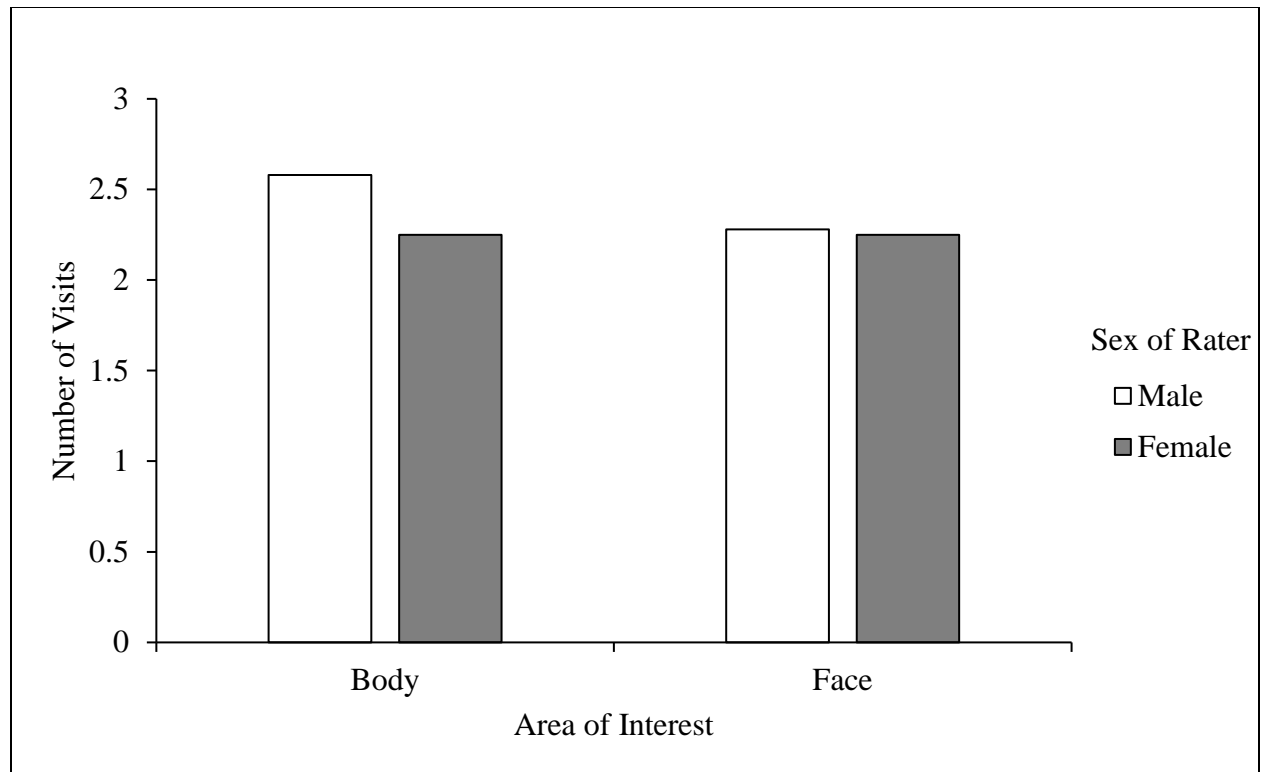*Figure 5.* Significant interaction between area of interest and facial weight for visit count.

Figure 6. Significant interaction between area of interest and rater sex for visit count.