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Original Article

Self-Perceived Attractiveness, Romantic Desirability and Self-Esteem: A Mating Sociometer Perspective

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Abstract: Sociometer theory proposes that self-esteem is an adaptation which evolved to monitor and regulate interpersonal relationships. It is therefore sensitive to self-assessments in domains relevant to relational desirability. Positive relationships between self-perceived physical attractiveness and self-esteem found in previous studies may reflect the functioning of a mating sociometer, designed to monitor individuals' desirability as romantic or sexual partners. We thus predicted that these relationships should be mediated by self-perceptions of romantic desirability, or more specifically, individuals' confidence in their abilities to successfully establish and maintain romantic relationships. Two hundred and eighty seven young adults (98 male) completed an online measure of self-perceived attractiveness, together with measures of self-confidence in appearance and romantic relationships, body-esteem and global self-esteem. Linear regression analyses indicated that self-perceived attractiveness, self-confidence in appearance and body-esteem all significantly predicted self-esteem, and that in each case, the relationship was mediated by romantic self-confidence. Self-perceived attractiveness predicted self-esteem significantly more strongly in females than in males. We discuss these results in relation to sociometer and parental investment theories, and explore limitations and future directions.

Keywords: sociometer, self-esteem, physical attractiveness, relationships, mediation

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Introduction

Self-esteem is one of the most widely studied constructs in social and personality psychology and has been of interest to the discipline from its very conception. However, it was only relatively recently that psychologists have turned their attention to evolutionary functional explanations of self-esteem. Following early theories of self-esteem, which linked it to feelings of dominance or superiority over others (Mead, 1934/1967; Maslow, 1937), such explanations have focused on the potential adaptive benefits of self-evaluation

in terms of monitoring individuals' status in intra-group competition for dominance, resources and mates (Alexander, 1980; Barkow, 1989). One of the most influential current theories, sociometer theory (Leary and Baumeister, 2000; Leary, Tambor, Terdal, and Downs, 1995), extends this perspective, proposing that self-esteem functions as an interpersonal monitor of the extent to which an individual is valued or devalued by others as a relational partner. It thus monitors the individual's eligibility for lasting, desirable social relationships. The sociometer is also concerned with motivating people to maintain a minimum level of acceptance from others.

Sociometer theory (Leary and Baumeister, 2000) has been supported by a range of experimental and questionnaire evidence. Self-esteem responded to a number of social inclusion or exclusion manipulations: For example, participants who are led to believe that they have been rejected by others experience a drop in self-esteem (Kavanagh, Robins, and Ellis, 2010; Leary, Haupt, Strausser, and Chokel, 1998). People who reported having higher-quality interpersonal relationships also reported higher levels of self-esteem, aggregate levels of self-esteem in citizens of different countries were positively correlated with the degree of close social interaction characteristic of individuals within those societies (Denissen, Penke, Schmitt, and van Aken, 2008), and people's scores on a variety of measures of self-esteem were positively related to their expectations of being positively evaluated by others (Back et al., 2009).

According to sociometer theory, self-esteem not only assesses and responds to the quality and quantity of an individual's actual relationships, but also monitors their eligibility for various *potential* relationships. Leary and Baumeister (2000) presented evidence suggesting that self-esteem is strongly linked to individuals' self-assessments in domains relevant to interpersonal attractiveness. Most modern treatments of self-esteem regard it as a multidimensional or hierarchical construct (Fleming and Courtney, 1984), made up of self-evaluations in a number of different domains, and a more global assessment of self-worth. For example, an individual may have high self-esteem with respect to academic abilities, whilst having low self-esteem regarding athletic abilities. As predicted by sociometer theory, many established dimensions of self-esteem are concerned with attributes which are especially important in establishing and maintaining social relationships. Most measures of self-esteem include subscales assessing participants' perceptions of their likeability or social skills, physical appearance, and competence in socially-valued domains such as academic performance or public speaking (Blascovich and Tomaka, 1991). People's self-assessments on these dimensions strongly predict their overall levels of self-esteem (Pelham and Swann, 1989). Thus, global self-esteem is derived from perceptions of qualities in specific domains that are valued by others.

Evolutionary psychologists have elaborated on the notion that self-esteem is an adaptive mechanism designed to monitor relational status and eligibility. In particular, Kirkpatrick and Ellis (2004) argued that social inclusion is not a single adaptive problem, but rather represents a loose collection of numerous more specific challenges. Since the characteristics of various types of relationships differ, different attributes may be required to establish and maintain them. For example, physical attractiveness may be an especially important asset when trying to attract a mate, but is less important in maintaining relationships with family members or colleagues. Just as self-esteem subsumes a number of

domains, so too does social inclusion involve a variety of social relationships, each with its own adaptive challenges. Thus the structure of self-esteem may reflect the diversity of social relationships that it has evolved to monitor and maintain, and there may be multiple sociometers, each responding to information relevant to a particular type of relationship (Kirkpatrick and Ellis, 2004). Furthermore, since various types of social relationships are likely to be of differential importance to specific individuals, we might expect individual differences in the strength of association between specific self-perceptions and self-esteem. Support for this contention comes from a series of studies showing that people's social roles mediated the relationship between specific self-perceptions and self-esteem (Anthony, Holmes, and Wood, 2007). People with more interdependent social roles had stronger associations between self-esteem and self-perceived *communal qualities*, such as kindness and supportiveness, than did those with more independent social roles.

The perspective of multiple, domain-specific sociometers (Kirkpatrick and Ellis, 2004), leads us to expect a distinct mechanism that is designed to monitor mating relationship status (i.e., a mating sociometer), given that successfully securing mates is a primary adaptive challenge. If the outcome of this monitoring process is negative, the sociometer should react by causing self-esteem to drop. This is supported by studies showing that romantic rejection strongly undermines self-esteem (Baumeister, Wotman, and Stillwell, 1993). Conversely, higher satisfaction with romantic relationships (Hendrick, Hendrick, and Adler, 1988) and perceptions of the commitment of romantic partners (Rill, Baiocchi, Hopper, Denker, and Olson, 2009) are associated with higher levels of self-esteem. Since the sociometer is also thought to be responsible for monitoring an individual's eligibility for mating relationships (Leary and Baumeister, 2000), self-esteem should reflect self-assessment of desirability as a mate. This was found in two studies involving overall self-esteem and measures of mate value (Brase and Guy, 2004; Penke and Dennisen, 2008).

A further study (Pass, Lindenberg, and Park, 2010, Study 1) provided additional evidence that self-esteem is especially sensitive to people's self-perceptions of their desirability as a mate. Participants of both sexes completed fake personality inventories and were then provided with false feedback relating to their capacity as a mating or friendship partner, which was ostensibly based on their responses. Those who received negative feedback about their capacity as a mate reported lower subsequent self-esteem than those who had received negative feedback about their friendship-capacity, and lower than controls who received no feedback. These findings suggest that since mating relationships are of particular evolutionary importance, assessments of eligibility for such relationships may have especially strong effects on levels of self-esteem.

One variable which has been widely studied in relation to self-esteem, and which has clear implications for romantic desirability, is self-perceived physical attractiveness. A meta-analysis of studies on the relationship between these variables found a moderate overall positive correlation ($r = .32$) between self-rated attractiveness and self-esteem (Feingold, 1992), and that this was significantly stronger for women ($r = .32$) than for men ($r = .27$). The traditional social science explanation for this sex difference is that it may reflect cultural values that emphasize women's physical attractiveness over men's (e.g., Mathes and Kahn, 1975). An evolutionary sociometer perspective would hold that since

physical attractiveness contributes more to mate value in women than in men (Buss, 1989), women's self-esteem should be more strongly related to their self-perceived attractiveness than is men's. In a variety of cultures, male mate value has been shown to be more strongly related to attributes that reflect access to resources, such as social status, intelligence, and industriousness (Buss, 1989). This is also supported by evidence that self-esteem correlates more strongly with socioeconomic status in men than in women (Twenge and Campbell, 2002).

Experimental evidence also supports the view that self-esteem responds to individuals' perceptions of their market value and that men and women respond to different cues to mate value. Pass et al. (2010, study 2) provided participants with false feedback that they were likely to be repeatedly rejected by potential romantic partners. Half were informed that this was due to their physical attractiveness, and half that it was a result of their lack of competence and status. Women in the attractiveness manipulation condition subsequently reported lower self-esteem than women in both the status manipulation and a control condition with no feedback. Men in the status manipulation condition reported lower levels of self-esteem than those in the other two conditions.

Thus the mating sociometer perspective predicts that individuals' self-assessments in domains relevant to mate value influence their self-esteem because these attributes affect their ability to form and maintain relationships with mates. The relationship between self-perceived attractiveness and self-esteem should be mediated by individuals' assessments of their desirability, and specifically, their confidence in their ability to form and maintain romantic relationships. We sought to investigate this by examining relationships between self-perceived facial and bodily attractiveness, romantic self-confidence and self-esteem in a sample of young adults. In doing so we employed a novel social comparison measure of self-perceived facial attractiveness.

Facial attractiveness forms only one component of overall physical attractiveness. Judges' ratings of physical attractiveness are strongly influenced by waist-to-hip ratio (Singh, 1993; Singh, Dixson, Jessop, Morgan, and Dixson, 2010) and body mass index (Tovée, Hancock, Mahmoodi, Singleton, and Cornelissen, 2002; Cornelissen, Tovée, and Bateson, 2009) in women, and height (Sear, 2006) and waist-to-chest ratio (Swami and Tovée, 2005; Swami et al., 2007) in men. We thus examined whether participants' feelings about their bodily attractiveness were also related to their levels of self-esteem. Although previous studies have demonstrated positive correlations between body-esteem (a measure of individuals' self-perceived bodily attractiveness) and self-esteem (Franzoi and Shields, 1984; Wade and Cooper, 1999; Wade, 2000), we sought to investigate whether this relationship is partly mediated by individuals' romantic self-confidence.

Thus the present study measured self-perceived facial and bodily attractiveness, appearance and romantic self-confidence, and self-esteem in a sample of young adults. We predicted that self-perceived facial and bodily attractiveness, and self-confidence regarding appearance, would be significantly related to self-esteem in both sexes and that these relationships would be stronger in women than in men, and partially mediated by romantic self-confidence.

Materials and Methods

Participants

There were 98 men and 189 women, aged from 18 to 35 (*M* = 21.5, *SD* = 3.64) and recruited via emails inviting students at two universities in the north of England to participate in a study on self-perceptions, who took part online. Since the study allowed participants to complete only some of the measures, separate sample sizes for each variable are reported in the Results section.

Measures

The study consisted of a web-based questionnaire which asked participants to complete a number of scales in the order shown below. The study was approved by the ethics committee of the University of Central Lancashire School of Psychology.

Self-esteem. Rosenberg's (1965) 10-item Self-Esteem Scale (SES) was used to measure global self-esteem. This measure asks participants to indicate their feelings towards self-descriptive statements (e.g., "I feel that I am a person of worth, at least on an equal basis with others," "At times I think I am no good at all") on four-point scales ranging from 1 ("strongly agree") to 4 ("strongly disagree"). This is the most widely used measure of self-esteem. Fleming and Courtney (1984) reported a Cronbach's alpha of .88, and the scale demonstrated a high degree of internal consistency in the present sample (*α* = .90).

Self-perceived facial attractiveness was measured by asking participants to compare their level of attractiveness to 25 male and 25 female images. For ethical reasons, the comparison images were composites rather than real individuals. Comparison stimuli were constructed for each sex by digitally combining 50 color JPEG images of faces which had been rated for attractiveness as part of a previous study: 25 male or female face stimuli were generated such that the two lowest-rated images were combined, then the next two lowest, proceeding in that fashion up to the two highest-rated pictures. This method was employed to try to ensure that there would be sufficient variance in the attractiveness of the stimuli to which participants would compare themselves. The composite-face stimuli were then rated for attractiveness, on 7-point Likert scales, by 64 undergraduate psychology students, as part of an unrelated study. The mean ratings for the stimuli ranged from .88 to 4.22 for the female and from 1.00 to 3.61 for the male faces.

For the same-sex images, participants were asked to "Please compare your own face to the faces below for attractiveness." For the opposite-sex images, participants were instructed: "In the next set of ratings you will see photos of the opposite-sex. When judging your face against theirs consider whether you think they would consider you as a potential partner." Participants compared themselves to each image on a seven-point scale where 1 corresponded to "my face is much *less* attractive," 4 to "same," and 7 to "my face is much *more* attractive." The order of presentation of images within the male and female sets was randomized for each participant.

Responses were scored in the following manner. Since ratings of 4 corresponded to *equally attractive*, these received a score equal to the mean attractiveness rating of the image presented. Ratings of 1, 2, and 3 corresponded to degrees of *much less attractive* and

thus received scores equal to the mean rating for the face presented, minus 3, 2, and 1, respectively. Conversely, ratings of 5, 6, and 7 corresponded to degrees of *much more attractive* and thus receive scores equal to the mean rating for the face presented, plus 1, 2, or 3, respectively. Thus the formula for scoring the test was:

Item score = mean attractiveness rating for image + (participant's response – 4)

and total test scores were the sum of the scores for all of the items.

Since participants' comparison scores on the male and female image tests were strongly positively correlated ($r = .81$, $p < .05$, $N = 246$), they were combined to produce a single facial attractiveness score for each participant. Cronbach's alpha for the combined scale was .98, and previous research had demonstrated that scores on the measure correlated moderately but significantly ($r = .67$, $p < .05$) with a widely used single-item measure of self-perceived facial attractiveness (Bale, 2004).

Self-perceived bodily attractiveness was measured using the 35-item Body Esteem Scale (BES: Franzoi and Shields, 1984). This widely-used instrument measures participants' global attitudes towards their bodies and also includes sex-specific subscales. For women, these measure sexual attractiveness, weight concern, and physical condition. For men, they measure physical attractiveness, upper body strength, and physical condition. The test consists of a list of body parts (e.g., "legs," "nose") and physical attributes (e.g., "energy level," "physical coordination"), and participants indicate their feelings towards each of them on a scale of 1 to 5 corresponding to "have strong negative feelings" and "have strong positive feelings," respectively. Franzoi and Shields (1984) reported Cronbach's alphas for the scale ranging between .78 and .87; in the present sample, $α = .92$.

Self-confidence was measured using the 54-item Personal Evaluation Inventory (PEI: Shrauger and Schohn, 1995). Participants are asked to indicate their feelings towards self-descriptive statements on four-point scales ranging from 1 ("strongly agree") to 4 ("strongly disagree"), and responses are scored such that higher scores represent greater self-confidence. Our analyses focused on participants' scores on the Appearance and Romantic sub-scales of the measure, which each consist of seven items. Examples of the first included: (1) "I am better looking than the average person" and (2) "Most people would probably consider me physically unattractive." Examples of the second are: (1) "I have no difficulty maintaining a satisfying romantic relationship" and (2) "I have more trouble establishing a romantic relationship than most people do." Blascovitch and Tomaka (1991) reported Cronbach's alpha values for the subscales ranging between .67 and .89; in the present sample, $α = .87$ and .83 for the Appearance and Romantic subscales, respectively.

Results

Table 1 shows descriptive statistics, and Table 2 shows inter-correlations for all study variables.

Table 1. Descriptive statistics for self-esteem, self-perceived facial attractiveness, self-confidence and body-esteem

Variable	Men				Women			
	N	*M*	*SD*	Range	*N*	*M*	*SD*	Range
Self-esteem	98	3.05	.43	2.00	183	2.88	.51	3.00
Self-perceived facial attractiveness	74	3.37	.86	3.64	172	3.43	.99	5.10
Self-perceived bodily attractiveness	98	3.38	.45	2.11	187	3.11	.57	3.14
Self-confidence in appearance	63	2.62	.59	2.57	147	2.45	.62	3.00
Romantic self-confidence	63	2.41	.67	2.71	147	2.57	.58	2.86

Note: Possible range for each measure: Self-esteem: 1 – 4; Self-perceived facial attractiveness: -.61 – 5.4; Self-perceived bodily attractiveness: 1 – 5; Self-confidence in appearance: 1 – 4; Romantic self-confidence: 1 – 4.
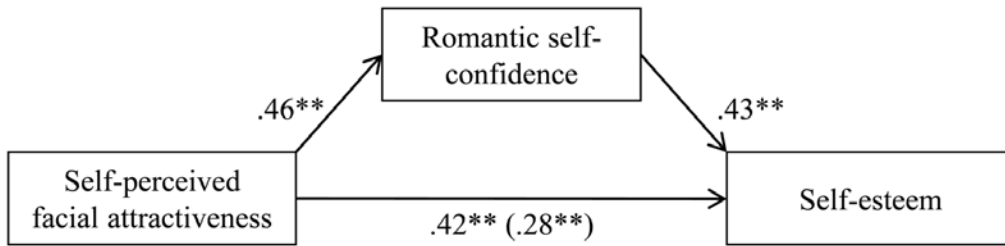
Table 2. Inter-correlations between self-esteem, self-perceived facial attractiveness, self-confidence and body-esteem

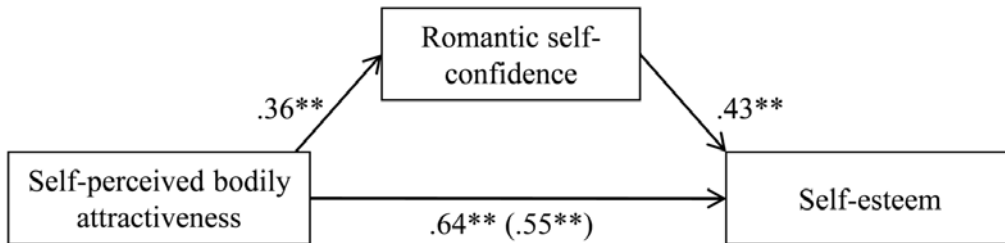| Variable	2	3	4	5
1. Self-esteem	.39**	.60**	.65**	.44**
2. Self-perceived facial attractiveness		.51**	.63**	.45**
3. Self-perceived bodily attractiveness			.68**	.35**
4. Self-confidence in appearance				.44**
5. Romantic self-confidence				

Note: ** $p < .01$

As expected, all variables were significantly positively related. Given that self-perceived facial and bodily attractiveness, and self-confidence in appearance, were significantly positively related, we created a measure of overall attractiveness by calculating the mean of the standardized scores on these measures for each participant. In order to examine whether self-perceived facial and bodily attractiveness, self-confidence in appearance, and overall attractiveness each significantly predicted global self-esteem in both sexes, we conducted a series of linear regression analyses. Following procedures initially described by Baron and Kenny (1986), we also conducted mediational analyses to examine whether the effects of these predictors on self-esteem were partially mediated by romantic self-confidence. Figures 1 to 4 show the results of these analyses.

Figure 1. Standardized regression coefficients for the relationship between self-perceived facial attractiveness and self-esteem as mediated by romantic self confidence

Note: The standardized regression coefficient between self-perceived facial attractiveness and self-esteem controlling for romantic self-confidence is shown in parentheses.
** *p* < .01

Figure 2. Standardized regression coefficients for the relationship between self-perceived bodily attractiveness and self-esteem as mediated by romantic self-confidence
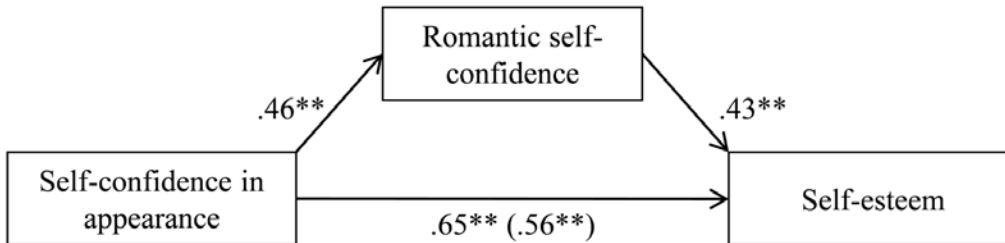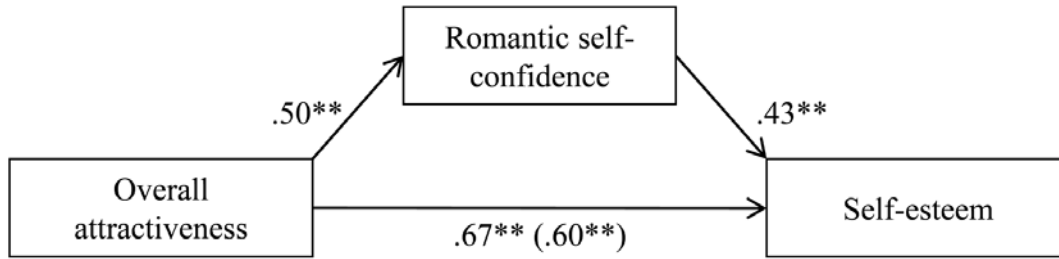

Note: The standardized regression coefficient between self-perceived bodily attractiveness and self-esteem controlling for romantic self-confidence is shown in parentheses.
** *p* < .01

Figure 3. Standardized regression coefficients for the relationship between self-confidence in appearance and self-esteem as mediated by romantic self-confidence

Note: The standardized regression coefficient between self-confidence in appearance and self-esteem controlling for romantic self-confidence is shown in parentheses.
** *p* < .01

Figure 4. Standardized regression coefficients for the relationship between overall attractiveness and self-esteem as mediated by romantic self-confidence

Note: The standardized regression coefficient between overall attractiveness and self-esteem controlling for romantic self-confidence is shown in parentheses.
** $p < .01$

It can be seen that self-perceived facial and bodily attractiveness, self-confidence in appearance, and overall attractiveness each significantly predicted self-esteem. In order to assess whether these relationships were significantly mediated by romantic self-confidence, we followed statistical bootstrapping procedures outlined by Preacher and Hayes (2004), employing their *SOBEL* script for PASW 18, which calculates mediational effect sizes based on the product of the unstandardized regression coefficients between the predictor and mediator, and mediator and criterion (referred to as *ab*), and reports confidence intervals for this based on bootstrap samples. These analyses indicated hypothesized small but significant mediational effects of romantic self-confidence on the relationship between self-perceived facial attractiveness and global self-esteem (*ab* = .015, 99% CI [.006, .028]) and bodily attractiveness and global self-esteem (*ab* = .024, 99% CI [.008, .042]), and significant medium mediational effects of romantic self-confidence on the relationship between self-confidence in appearance and global self-esteem (*ab* = .102, 99% CI [.010, .206]) and overall attractiveness and self-esteem (*ab* = .390, 95% CI [.014, .753]) (see Kenny, 2011, for recommendations on how to interpret the magnitude of mediation effect size estimates).

In order to examine whether self-perceived facial and bodily attractiveness, self-confidence in appearance, and the aggregate measure of overall attractiveness significantly predicted self-esteem separately in each sex, we conducted a series of linear regression analyses. In order to examine whether there were any sex differences in the strength of these predictors, we dummy coded sex and calculated an interaction term between this variable and each predictor. Table 3 shows the results of these analyses.

Table 3. Sex differences in effects of self-perceived facial and bodily attractiveness and self-confidence in appearance, and overall attractiveness on self-esteem

Predictor	Sex	*B*	SE B	β	*R²*
SPFA	Male	.04	.01	.33**	.11**
	Female	.04	.01	.43**	.18**
SPFA*Sex		.01	.01	.19**	
SPBA	Male	.17	.02	.62**	.39**
	Female	.14	.02	.57**	.32**
SPBA*Sex		.01	.01	.04	
SCApp	Male	.60	.12	.55**	.30**
	Female	.83	.08	.67**	.45**
SCApp*Sex		.05	.03	.09*	
OAtt	Male	4.11	.67	.63**	.39**
	Female	3.86	.37	.67**	.45**
OAtt*Sex		3.90	.39	.58**	

Note: SPFA = Self-perceived facial attractiveness, SPBA = Self-perceived bodily attractiveness, SCApp = Self-confidence in appearance, OAtt = Overall Attractiveness
** $p < .01$, * $p < .10$

In both men and women, as predicted, self-perceived facial and bodily attractiveness self-confidence in appearance, and overall attractiveness all significantly predicted global self-esteem. Analyses of the interaction terms indicate that, as predicted, the relationship between self-perceived facial attractiveness, and the overall measure of attractiveness and self-esteem is significantly stronger in women than in men. Although the relationship between self-confidence in appearance and self-esteem also appeared to be stronger in women, this sex difference was only marginally significant ($p < .10$). Contrary to our hypothesis, the relationship between self-perceived bodily attractiveness and self-esteem appears to be stronger in men than in women, although this difference was not significant ($p = .37$).

Discussion

We found that self-perceived facial and bodily attractiveness and self-confidence in appearance all significantly predicted self-esteem in both sexes, and in each case, these relationships were partially mediated by participants' romantic self-confidence. This suggests that correlations between self-perceived attractiveness and self-esteem found in previous studies (Feingold, 1992), and here, can be explained in terms of sociometer theory, which predicts that self-esteem is sensitive to self-perceptions in domains relevant

to relational desirability. Our mediational analyses suggest that self-perceived attractiveness may influence self-perceived romantic desirability, which in turn may influence self-esteem (although given the correlational design of our study, we must be cautious about inferring such causal relationships). It is important to note that romantic self-confidence only partially mediated the relationships between measures of self-perceived attractiveness and self-esteem, and that the mediation effects were substantially smaller than the direct effect of each predictor, indicating that there are additional, stronger direct relationships between the attractiveness measures and self-esteem. Given that greater physical attractiveness is also associated with more positive friendship, professional and even familial relationships (Langlois et al., 2000), these results are still consistent with a sociometer perspective.

We obtained more mixed results with respect to sex differences in the associations between self-perceived attractiveness and self-esteem. Although facial attractiveness and composite overall attractiveness were both more strongly related to self-esteem in women than in men, confidence in appearance was only marginally so, and no sex difference was found for bodily attractiveness. It should be noted that bodily attractiveness measures traits relevant to physical condition and strength which, whilst predicting physical attractiveness in men (Frederick and Haselton, 2007; Swami and Tovée, 2005; Swami et al., 2007) may also be related to dominance, social status and other variables relevant to parental investment (Sell et al., 2009). Moreover, athletic ability, which should relate to men's assessments of their bodies, is thought to be important in male intrasexual competition for mates (Faurie, Pontier, and Raymond, 2004; Farrelly and Nettle, 2007; Schulte-Hostedde, Eys, and Johnson, 2008). Thus, whilst theory predicts that physical attractiveness, by virtue of signaling reproductive potential, should be more important for female romantic desirability (Buss, 1989), by additionally signaling cues to traits relevant to competitive ability in males, these aspects of bodily attractiveness are likely to be important for self-esteem in men.

The absence of sex differences in two of the relationships between specific attractiveness measures and self-esteem may also be partially due to the demographic profile of our sample, which consisted largely of young undergraduate students. The importance of traits relevant to parental investment, such as social status and economic resources, may be attenuated in men of this age group, relative to older men. In their absence, bodily attractiveness may be a more important component of men's romantic desirability, thus explaining the relative lack of a clear sex difference in this case. This possibility could be investigated by examining whether the relationship between self-perceived attractiveness (particularly bodily attractiveness) and self-esteem is lessened in older men. Similarly, future studies could profitably examine sex differences in relationships between self-esteem and other aspects of mate value, particularly those relevant to parental investment such as wealth and social status.

Although our results broadly support a sociometer perspective on the relationship between self-perceived attractiveness and self-esteem, there are several potential limitations to our study. In addition to the usual limitation of being unable to make causal inferences based on cross sectional studies, another limitation is related to the construct of self-perceived romantic desirability, and our operationalization of this as romantic self-

confidence, measured by the PEI. The decision to use this measure was based on the reasoning that a functional sociometer perspective would predict that self-perceived attractiveness correlates with self-esteem because physical attractiveness is an attribute important for the ability to form and maintain romantic relationships. Thus we predicted that individuals' romantic self-confidence, which concerns their self-evaluations of this ability, should mediate the link between self-perceived attractiveness and self-esteem. Although the PEI measure of romantic self-confidence has excellent psychometric properties (Shrauger and Schohn, 1995), it has not been as widely used as other measures such as the Self-Perceived Mating Success Scale (SPMSS; Landolt, Lalumière, and Quinsey, 1995). This focuses on people's perceptions of how much positive attention they receive from members of the opposite sex, and their access to sexual partners. Although these perceptions are likely to influence confidence in the ability to form and maintain romantic relationships, we considered that the PEI provided a more direct measure of romantic self-confidence. A further consideration is that items on the SPMSS are primarily relevant to short-term relationships. The mating sociometer perspective predicts that self-esteem should be sensitive not only to desirability as a short-term partner but also to confidence in the ability to establish and maintain long-term relationships, especially for women. Given that the PEI includes items relevant to both short- and long-term relationships, it therefore provided a more comprehensive measure of self-perceived romantic desirability in the present context.

Another potential limitation concerns our interpretation of sociometer theory, specifically the prediction that individuals' confidence in their ability to form and maintain romantic relationships should mediate the relationship between self-perceived attractiveness and self-esteem. An alternative possibility is that specific self-perceptions directly influence self-esteem, rather than the relationship being mediated by conscious appraisals of the significance of level of physical attractiveness for individuals' romantic relationships. On this view, self-esteem would simply be an affective "gut reaction" based on the extent to which others value the individual as a relational partner. Leary (2004) suggested that the sociometer system may have evolved from more primitive, purely affective systems designed to monitor dominance-submission and inclusion-exclusion relationships in the immediate social context. He went on to argue that the emergence of the conceptual self in humans created a more complex sociometer system which integrated individuals' immediate, non-conscious affective reactions to social feedback with longer-term cognitive appraisals of their abilities and relational value. We suggest that the direct relationship between self-perceived attractiveness and self-esteem found in the present study largely reflects the non-conscious, affective response of the sociometer system to individuals' everyday experiences of interactions with others, which are likely to be influenced by their appearance. The mediational effect of romantic self-confidence may reflect conscious appraisals of the implications of the level of attractiveness for the person's ability to form and maintain romantic relationships. According to this analysis, had we found no mediational effect of romantic self-confidence, we would not necessarily reject a sociometer account of the relationship between self-perceived attractiveness and self-esteem, but perhaps instead conclude that conscious appraisals of the implications of attractiveness for romantic relationships do not influence this.

This discussion relates to wider issues surrounding the conceptualization and measurement of components of the self and self-esteem. Theories and measures of self-esteem have traditionally placed different degrees of emphasis on self-evaluations of competence, skills or abilities, and a more affective, global sense of self-worth (Wells and Marwell, 1976). Different theoretical models of self-esteem have disagreed about whether these are truly distinct but related constructs, or are aspects of the same construct. Although this issue is beyond the scope of the present paper, our analysis does assume that self-confidence is distinct from self-esteem. Consistent with this, Shrauger and Schohn (1995) found that scores on a measure of romantic self-confidence were independent of those on Rosenberg's (1965) Self-Esteem Scale, a global measure of self-worth. We therefore consider that including these two measures in the current study provided a valid means of investigating whether romantic self-confidence mediates the relationship between self-perceived attractiveness and self-worth. Although we interpreted the significant positive relationship between these measures in terms of a sociometer perspective whereby romantic self-confidence predicts self-esteem, we cannot rule out the possibility that the correlation reflects an overlap between instruments which are measuring similar constructs.

It is important to note that our mediational analyses assumed that specific self-evaluations causally affect self-esteem. Sociometer theory suggests that this reflects the adaptive function of self-esteem, which evolved to monitor individuals' relational status together with traits relevant to this (Leary and Baumeister, 2000). However, given that the correlational design of this and almost every previous study in this area (e.g., Feingold, 1992) does not allow a definitive causal interpretation of the associations, we must seek alternative evidence for these causal assumptions. Pass et al. (2010, study 2) did find that women who were given negative false-feedback about their physical attractiveness subsequently reported lower self-esteem than controls, suggesting that changes in self-perceived physical attractiveness do have an immediate impact on self-esteem.

Alternative theories of self-esteem propose that self-worth causally affects specific self-perceptions (Brown, Dutton, and Cook, 2001): Thus self-esteem would drive perceptions of attractiveness, rather than the reverse, as assumed here. To our knowledge, no previous research has examined whether experimentally manipulating individuals' self-esteem affects their self-perceived attractiveness. To eliminate the possibility that this is the case, further experimental research, which independently manipulates specific self-perceptions (e.g., Pass et al, 2010) or self-esteem, is required in order to examine their possible effects on each other. Similarly, longitudinal diary studies examining whether changes in self-esteem are predicted by everyday changes in individuals' self-perceptions in domains relevant to interpersonal relationships, and their experiences of interactions with actual or potential romantic partners, would help to differentiate between these alternate theories.

In addition, further research could profitably examine whether the kinds of mediational relationships we discuss here also operate in the context of other, non-romantic interpersonal relationships as would be suggested by a modular sociometer perspective (Kirkpatrick and Ellis, 2004). For example, Srivastava and Beer (2005) investigated relationships between individuals' attachment styles, self-evaluations and self-perceptions of the regard of others for them, and others' actual liking of them, in a series of small group

interactions. They showed that, consistent with a sociometer perspective, being liked by others lead to more positive self-evaluations, and this was moderated by individuals' attachment anxiety. Further research of this kind investigating complex relationships between constructs including self-perceptions and evaluations, self-esteem and individual differences in interpersonally relevant variables (such as attachment style) in the context of peer and family relationships would complement the present research and provide further insight into the possible functioning of the sociometer.

If self-esteem is an evolutionary adaptation, we would expect it to functionally influence individuals' interpersonal behavior. Kirkpatrick and Ellis (2004) suggested that one of the ways in which the sociometer system might do this is by linking self-assessments of relational value with adaptive choices about relational targets, through the mediating influence of self-esteem. A study by Kavanagh et al. (2010) supports this suggestion. Participants first received either accepting or rejecting feedback about their desirability as a date from an attractive confederate of the opposite sex. This feedback was found to influence how well-matched they felt they were with individuals of the opposite sex who differed in mate value. Those who had received rejecting feedback rated themselves as being more compatible with low mate-value targets, whereas those who had received accepting feedback rated themselves as more compatible with high mate-value targets. These effects were mediated by changes in self-esteem in response to acceptance or rejection. Kavanagh et al. (2010) argued that this supported a sociometer view of the function of self-esteem, in that participants were adaptively regulating their relational aspirations in response to interpersonal feedback. Other than this, there is at present little evidence that self-esteem causally affects relational behavior (Baumeister, Campbell, Krueger, and Vohs, 2003). Thus future research could profitably examine whether self-esteem adaptively guides relational behavior, as predicted by sociometer theory. In particular, studies could examine whether self-esteem influences the use of specific mate attraction (Buss, 1988a) and retention (Buss, 1988b) tactics. If self-esteem does influence individuals' use of such tactics in adaptive ways, this would support the sociometer theory view that self-esteem evolved to monitor and regulate interpersonal relationships.

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