

Body Image and Day-to-Day Social Interaction

John B. Nezelek

College of William & Mary

ABSTRACT Participants maintained a social interaction diary and completed a measure of body image. Body image was found to have three factors, body attractiveness, social attractiveness (how attractive people believed others found them to be), and general attractiveness. For both men and women, self-perceptions of body attractiveness and of social attractiveness were positively related to the intimacy they found in interaction. Self-perceptions of social attractiveness were positively related to women's confidence in social interaction and their perceived influence over interaction, whereas for men, confidence and influence were unrelated to social attractiveness. For both men and women, body image was unrelated to how enjoyable people found interactions to be and was weakly related to how responsive they felt others were to them. For both men and women, body image was also unrelated to how socially active people were and to the relative distribution of same- and opposite-sex interactions.

The correlates and sequelae of physical appearance have long been of interest to psychologists, and research on physical appearance has tended to conceptualize appearance in one of two ways, as either a characteristic that influences how others evaluate or treat people or as part of individuals' self-concept. Research from the first perspective has generally focused on social psychological issues such as the relationships between

I am grateful to Lee Kirkpatrick and two anonymous reviewers for their comments on previous versions of this article.

Correspondence regarding this article should be sent to John B. Nezelek, College of William & Mary, Department of Psychology, PO Box 8795, Williamsburg, VA 23187-8795, email: jbnezl@facstaff.wm.edu.

Journal of Personality 67:5, October 1999.

Copyright © 1999 by Blackwell Publishers, 350 Main Street, Malden, MA 02148, USA, and 108 Cowley Road, Oxford, OX4 1JF, UK.

attractiveness and social experience and the relationships between perceptions of attractiveness and judgments of other characteristics. In contrast, research on self-evaluations of physical appearance (body image) has had a more clinical focus, with emphases on body-image disturbance, eating disorders, and other aspects of psychological adjustment. See Jackson (1992) for a thorough review of research on physical appearance.

The present study combined these two approaches by examining the relationships between body image and day-to-day social interaction. These relationships were selected for study for two reasons. First, although body image has been found to have numerous psychologically meaningful correlates (Jackson, 1992), no previous study has examined the relationships between body image and daily social life. Second, previous research and theory suggest that body image is a critical aspect of social development (Jovanovic, Lerner, & Lerner, 1989; Langlois & Stephan, 1981; Sorel & Nowak, 1981), and if this is the case, then body image should be related to people's daily social experiences.

The primary hypothesis guiding the present study was that individuals with more positive body evaluations would have more rewarding day-to-day social interactions. This hypothesis was based on previous research demonstrating that people with a more positive body image tend to be better adjusted than those with a less positive image (e.g., Noles, Cash, & Winstead, 1985; Thompson, 1990) and on research demonstrating that psychological adjustment is positively related to how rewarding people find day-to-day social interaction (e.g., Nezlek, Hampton, & Shean, *in press*; Nezlek, Imbrie, & Shean, 1994).

Body image were measured using a version of the Body-Self Relations Questionnaire (BSRQ; Winstead & Cash, 1984), and day-to-day social interaction was measured using a variant of the Rochester Interaction Record (RIR; Wheeler & Nezlek, 1977). Body image was measured using the BSRQ because the BSRQ is well-validated and has been used extensively in research on body image. See Cash (1994) for a review of much of this research. Day-to-day social interaction was measured using the RIR because it too is well-validated (Nezlek, Wheeler, & Reis, 1983; Reis & Wheeler, 1991), and it provides both finely differentiated and broad based measures of day-to-day social interaction across a wide variety of naturally occurring situations.

Much of the previous research on body image has examined relationships between body image and social behavior in limited settings such

as laboratory interactions or has examined the relationships between body image and measures of global constructs such as psychological adjustment. Although meaningful in their own right, studies of both types leave important questions unanswered. First, it may be difficult to generalize the results of laboratory studies because such studies may have limited external validity. By design, laboratory research typically examines behavior in a limited number of situations to ensure that studies are internally valid and that inferences are clear. Second, by definition, global measures do not distinguish different aspects of people's lives, and because of this, global measures cannot address questions about the similarity of the relationships between body image and social experience across different domains and different characteristics of social experience.

Using the RIR, relationships between body image and day-to-day social interaction could be studied in a way that avoided these shortcomings. The RIR measures day-to-day social interaction across a broad range of naturally occurring situations and avoids the limitations of the specificity of laboratory studies, while it provides opportunities to conduct more fine-grained analyses. The RIR provides separate measures of interaction quantity and quality so that relationships between body image and quantity of interaction could be examined separately from relationships between body image and qualitative reactions to social interaction. In addition, the RIR provides descriptions of the quantity and quality of different types of social interaction, for example, interactions with same-versus opposite-sex others, allowing separate analyses of relationships between body image and social interaction across different social domains.

In addition to distinguishing quantity of interaction from qualitative reactions to interaction, the RIR can measure different reactions to interactions. In this study, reactions to interaction were measured along two dimensions, corresponding roughly to a socioemotional and an instrumental dimension. These two dimensions were suggested in part by previous research on interpersonal behavior. For example, Bales (1950) identified two levels at which group members interact, an expressive or socioemotional level and a task or instrumental level. A similar distinction has been made in research about gender roles that has suggested that women tend to be nurturant and men tend to be instrumental. In the present study, these two dimensions were conceptualized more along lines described by Spence (1984), who suggested that nurturance

and instrumentality are dimensions describing interpersonal styles more than gender specific roles. Within this framework, men and women can both be evaluated in terms of these two dimensions.

These dimensions also were suggested by their possible relationships with body image. Body image was expected to be positively related to socioemotional characteristics of interaction (enjoyment, intimacy, and the responsiveness of others) because people with more positive body images may feel more at ease in social situations and feel less anxious about interpersonal closeness. Such a prediction is consistent with research suggesting that poor body image is associated with difficulties in maintaining or establishing intimate relationships (e.g., Harris, 1994).

Body image was also expected to be positively related to the instrumental characteristics of interaction (confidence and perceived influence). Previous research (e.g., Reis, Wheeler, Spiegel, Kernis, Nezlek, & Perri, 1982) has suggested that more physically attractive people rely more on their attractiveness as a means of social influence than less attractive people. In turn, more attractive people may have more positive body images and may come to rely on their attractiveness as a means of influence more than less attractive people. A positive relationship between body image and instrumentality is also consistent with research and theory using an evolutionary perspective. Within such a perspective, physical attractiveness is presumed to be positively related to social success for both males and females, albeit for somewhat different reasons (e.g., Buss, 1994).

The second hypothesis of the study was that relationships between body evaluation and quality of day-to-day social interaction would be stronger for women than for men. This hypothesis was based on research suggesting that body image is more central to women's self-concepts than it is to men's. Research on body image has consistently found that women are more concerned about physical appearance than men (e.g., Cash & Henry, 1995), and that negative body image is more of a problem for women than for men (e.g., Pliner, Chaiken, & Flett, 1990). Moreover, body-self relations appear to be more closely related to self-concept and psychological well-being for women than for men (e.g., Jackson, Sullivan, & Rostker, 1988). Both hypotheses of the study are consistent with conclusions reached by Jackson (1992) in her review of research on the psychological implications and correlates of physical appearance (pp. 194–202).

It is important to note that the present hypotheses concerned people's reactions to social interaction, not the quantity of social interaction. Previous research suggests that psychological adjustment is more closely related to the quality of people's social lives than to how socially active they are *per se* (Marangoni & Ickes, 1989; Nezlek et al., 1994; Nezlek et al., in press). In light of this, it was expected that body evaluation and quantity of social interaction would not be related.

METHOD

Participants

Participants were 124 introductory psychology students, 66 women and 58 men, who had indicated on a questionnaire distributed in class that they were interested in participating in a diary study. All were paid \$20 for their participation, and no other incentives were provided.

Measures

Social interaction was measured using a variant of the RIR (Wheeler & Nezlek, 1977). Similar to previous studies using the RIR, participants described the social interactions they had by indicating who their cointeractants were for up to four different cointeractants. They used unique initials for each cointeractant, and they indicated the sex of cointeractant. If more than four others were present, the interaction was considered to be a group interaction and no individual initials were listed. The length of each interaction also was reported.

Participants also rated each interaction using five scales, three of which, enjoyment, intimacy, and others' responsiveness, measured the socioemotional dimension, and two of which, influence and confidence, measured the instrumental dimension of interaction. These ratings were made using 9-point scales, labelled 1 = *not*, 3 = *slightly*, 5 = *somewhat*, 7 = *quite*, and 9 = *very*. These labels were chosen to represent roughly equal intervals according to research on the relative strength of modifiers (Cliff, 1959).

Body evaluation was measured using a version of the BSRQ (Winstead & Cash, 1984). The version of the BSRQ from which the present measure was taken had three subscales; however, only the Body Evaluation subscale was used because it was the subscale that most directly concerned body image. The most recent version of the BSRQ, the Multidimensional Body-Self Relations Questionnaire (Brown, Cash, & Mikulka, 1990; Cash, 1994), does not contain all the

items used in the present study. The larger set of items from the BSRQ was used in the present study to obtain a richer description of body evaluation.¹

Procedure

During an introductory meeting, the importance of understanding social interaction was explained, and the participants' role as collaborators was emphasized. Participants were told that the study concerned people's patterns of social interaction and that they would use a structured diary form to describe their social interactions. The instructions were modelled closely after those introduced by Wheeler and Nezlek (1977).

Participants were told to use the RIR to record every social interaction they had that lasted ten minutes or longer during a 3-week period.² An interaction was defined as any encounter with another person (or people) in which the participants attended to one another and adjusted their behavior in response to one another, a definition similar to Goffman's (1971) definition of a "social with." Examples were provided to clarify what was an interaction, such as going to dinner, and what was not, such as sitting next to someone while watching a movie and not talking at all.

The various response categories on the RIR were discussed until participants understood their definitions and felt comfortable with the forms and the procedure. Enjoyment was defined as "how pleasurable or satisfying" the participant found each interaction to be. Intimacy was defined as "how interpersonally close" an individual felt to his or her cointeractants, with specific mention that "intimacy does not have to be sexual, nor does it have to be evident only through conversation." Responsiveness was defined as "how responsive to your needs and feelings you felt the people in the interaction were . . . the extent to which other people changed their behavior to accommodate your particular needs and feelings." Influence was defined in terms of the extent to which the participant felt that he or she "controlled the interaction (e.g., initiation, determining what was to be done, where to go, etc.)," and confidence was defined as "how

1. The Appearance Evaluation subscale of the MBSRQ contains seven items, and six of these were used in this study. Of these six, five loaded most highly on the first factor, *Body*.

2. Similar to past research using the RIR, interactions over 300 minutes (less than 3% of the total) were divided into shorter, sequential interactions. The total time of these interactions equalled the length of the original interaction, and all information from the original interaction was repeated for each shorter interaction. Also, some participants maintained the diary for more than 3 weeks because they scheduled their poststudy interview more than 3 weeks from the day they began the study and they maintained the diary until they were interviewed.

self-assured you were and how competent you felt.”

Participants were told to complete the records at least once a day at a uniform time, such as before going to sleep. Days that were forgotten or missed were to be skipped. They were given enough interaction forms for the duration of the study and an instruction booklet that repeated the instructions provided during the meeting. After 3 days, participants were contacted to see if they were having any problems maintaining the diary; none was reported.

At the conclusion of the recordkeeping period, participants were interviewed individually about the difficulties and potential sources of inaccuracy in their data. They were encouraged to be candid when describing how they maintained the diary, and they were told they would be paid regardless of what they said about how they maintained their diaries.

Participants maintained their diaries an average of 22 days ($SD = 2.6$). All participants maintained the diary for at least 13 days, and 75% maintained it for between 19 and 23 days. Participants reported updating their diaries an average of 1.4 times per day and spending an average of 14 minutes per day doing this. Participants' answers to other questions about how they maintained the diary were very similar to those given by participants in other RIR studies (Nezlek et al., 1983), and they strongly suggested that participants maintained the diary in accordance with instructions and that the diaries were accurate representations of their social lives. In the interest of brevity, these data are not presented. Following the interview, participants completed the BSRQ, they were paid, and any questions they had about the study were answered.

RESULTS

Overview of Analyses

The first step in the analyses was an evaluation of the psychometric properties of the Body Evaluation subscale of the BSRQ. Contrary to expectation, this evaluation suggested that the Body Evaluation scale was not unidimensional but was best represented by three factors. Next, the relationship between participants' scores on these factors and their day-to-day social interactions were examined using a series of hierarchical linear models. Some analyses examined reactions to interaction, and others examined quantity of interaction.

Most previous research using diaries such as the RIR has relied on ordinary-least-squares (OLS) analyses of aggregated means. For example, average number of interactions per day and average enjoyment in interaction have been correlated with individual differences such as loneliness (Wheeler, Reis, & Nezlek, 1983). These procedures were

introduced by Wheeler and Nezlek (1977) and are discussed in detail by Nezlek and Wheeler (1984). Although these procedures have provided empirical support for a wide variety of hypotheses (Nezlek et al., 1983; Reis & Wheeler, 1991), more recently available procedures, generally referred to as random-coefficient models, provide important advantages over them.

The random-coefficient modelling technique used in the present study was the hierarchical linear modelling procedure HLM (Bryk & Raudenbush, 1992). These analyses had the same target of inference as previous OLS analyses, but provided more accurate parameter estimates than OLS-based techniques. HLM uses precision-weighting to estimate parameters. As part of this procedure, more reliable units of observation (e.g., participants whose ratings of interactions are more consistent across interactions) contribute more to the estimation of parameters than less reliable units. Furthermore, precision weighting is part of a combination of Bayesian and maximum-likelihood estimation procedures used in HLM that separate the total variance of a parameter into true and error variance. In contrast, in OLS analyses, true and error variance are not separated. By separating true and error variance, HLM provides more reliable and robust estimates of parameters than OLS analyses. See Bryk and Raudenbush (1992, pp. 32–57) for a discussion of some of the principles of estimation and testing that bear on this point.

The data were analyzed with a series of hierarchical linear models using the program HLM (Version 4.03; Bryk, Raudenbush, & Congdon, 1996). One set of analyses focused on interaction quantity, and a second focused on reactions to interactions. Moreover, measures of interaction were examined at two levels of generality. One level considered all interactions together, and a second distinguished interactions as a function of whether cointeractants were the same or the opposite sex as the participant. Previous research, reviewed in Nezlek et al. (1983) and Reis and Wheeler (1991), has found these two levels of analysis to be meaningful ways of conceptualizing social interactions among peers, and virtually all of the interactions in the present study were with peers (other college students).

Dimensions of Body Evaluation

The Body Evaluation subscale was intended to be a single-factor scale; however, a maximum-likelihood confirmatory factor analysis of the 18 items constituting the subscale found a poor fit between the data and a

single-factor model, $\chi^2(135) = 545.7, p < .001$, suggesting a multifactor model. Additional analyses suggested that these data could be represented by three factors. Three factors were chosen because an exploratory analysis produced three factors with eigenvalues greater than 1.0, and because a three-factor model fit the data better than a two-factor model, $\chi^2(18) = 10.5, p < .01$. To produce factor scores, responses were subjected to a principal components analysis (three factors) followed by an orthogonal (varimax) rotation.³ The items and factor loadings are presented in Table 1.

The first factor was labelled *Body* because the items with large coefficients on this factor explicitly concerned bodily attractiveness (e.g., “I hate people looking at my body” and “I think my body is sexually appealing”). The second factor was labelled *Social*, because the items with large coefficients on this factor concerned how attractive participants believed other people found them to be (e.g., “People often compliment me on my good looks”). The third factor was the least clear of the three and appeared to be some sort of general attractiveness evaluation, and because of this, the third factor was labelled *General*.⁴

HLM Models

The models and equations comprising the analyses are described using the nomenclature standard in multilevel analyses. In these analyses, interaction- and day-level phenomena were modelled at what is called level 1 in HLM terminology, and interactions and days were the units of analysis at level 1. In turn, individual differences in interaction- and day-level phenomena were analyzed at what is called level 2 in HLM terminology, which was the individual participant in the present study. This analytic strategy is described in Nezlek (1999). The 124 participants in the study described 15,430 interactions over a total of 2,724 days.

3. An oblique rotation (direct quartimin) produced relatively low correlations between factors (.2 to .3). In light of this, and given the ease of using orthogonal factor scores in the HLM analyses, an orthogonal solution was selected. Also, the results of analyses using composite scores in which items with coefficients greater than .5 were used as the basis for computing scores were very similar to the results presented in this paper.

4. Although the number of participants did not permit a thorough examination of the similarity of the factor structures of men and women, separate factor analyses of men's and women's responses suggested that the factor structures were similar. Details of these analyses are available from the author.

Table 1
Body Evaluation: Items and Factor Loadings

	Factor		
	<u>1</u>	<u>2</u>	<u>3</u>
<i>Factor 1: Body</i>			
I like the way I look without my clothes.	.86		
I feel my weight is just right.	.76		
I hate people looking at my body.	-.74		
Few people think I have a sexy body.	-.71		
I like the way my clothes fit me.	.71		
I think my body is sexually appealing.	.68		
From the standpoint of their looks, I would like to change some parts of my body.	-.61		
<i>Factor 2: Social</i>			
People often compliment my good looks.		.76	
Most people would consider me good-looking.		.74	
Members of the opposite sex think I am attractive.		.72	
My good looks are advantageous to me.		.70	
I am not at all photogenic.		-.67	
People never comment on how I look.		-.62	
If I want to make an impression on someone, I can use my physical appearance to do it.		.62	
<i>Factor 3: General</i>			
My facial features are pleasing to me.			.81
I like my looks just the way they are.			.66
I feel that I am physically unattractive.			-.59
When it comes to improving my appearance, I feel helpless.			-.50

Note. Loadings less than .50 have been omitted.

To describe interaction- and day-level phenomena, a model was estimated for each participant. The basic model was:

$$y_{ij} = \beta_{0j} + r_{ij}.$$

In these models, β_{0j} was a random coefficient which represented the mean of y_{ij} across all observations (days or interactions, subscripted i) for each participant (subscripted j), and r_{ij} represented residual variance (error). In the analyses of quantity of interaction, β_{0j} represented an individual's mean for a measure of interaction quantity such as number of interactions per day, and for the analyses of reactions to interaction, β_{0j} represented individual's means for each of the five ratings. Bryk and Raudenbush (1992) refer to such models as "Means as outcomes."

Previous research has not examined the dimensionality of Body Evaluation, and so the hypotheses that guided the present study were not informed by the dimensionality found in the analyses described above. Nevertheless, the dimensionality of Body Evaluation was incorporated into the analyses by including separate terms for each factor and for the interaction of each factor with participant sex.

Relationships between body evaluation and social interaction were examined by analyzing the coefficients representing the means (the β_{0j} s) from the interaction- and day-level models. In these models, participant sex was represented by an effect-coded variable (women coded as 1 and men as -1). Interactions between participant sex and the different body evaluation factors were represented by the product of the effect-coded sex variable and each factor score. The full person-level model was:

$$\begin{aligned} \beta_{0j} = & \gamma_{00} + \gamma_{01}(\text{SEX}) \\ & + \gamma_{02}(\text{BODY}) + \gamma_{03}(\text{BODY-SEX}) \\ & + \gamma_{04}(\text{SOCIAL}) + \gamma_{05}(\text{SOCIAL-SEX}) \\ & + \gamma_{06}(\text{GENERAL}) + \gamma_{07}(\text{GENERAL-SEX}) + u_{0j} \end{aligned}$$

The main effect for each body-evaluation factor was tested by the significance of the coefficient corresponding to the variable representing that factor (e.g., the γ_{02} coefficient for the *Body* factor). The interactions between sex and body evaluation factors were tested by the significance

of coefficients corresponding to the variables representing these interactions (e.g., the γ_{03} coefficient for the *Body*-sex interaction). Error was represented by u_{0j} .

Reactions to All Social Interactions

The first set of analyses examined relationships between body evaluation and reactions to all interactions. Interpreting the results of HLM analyses requires knowing the distribution of the variables being modelled, and the distributions of ratings of interactions are presented in Table 2. The distributions of the factor scores are not presented because all three were standardized with a mean of 0 and an *SD* of 1.0.

The analyses of the two measures of the instrumental dimensions of interaction, confidence and influence, supported both hypotheses of the study, particularly in terms of the relationships between these ratings and the *Social* factor. As expected, the relationships between confidence and influence and the *Social* factor were positive, and the interaction of this factor and participant sex was also significant in the analyses of both variables. The results of these analyses are presented in Table 3.

To interpret the interaction of sex and the *Social* factor in the analyses of confidence and influence, predicted confidence and influence scores were generated for men and women who were one standard deviation above and below the mean on the *Social* factor. These predicted scores indicate that the interaction occurred primarily because the *Social* effect was virtually nonexistent for men whereas it

Table 2
Descriptive Statistics of Ratings of Interactions

	<i>Mean</i>	<i>SD</i>
<i>Instrumental</i>		
Confidence	7.2	1.5
Influence	6.5	1.8
<i>Socioemotional</i>		
Intimacy	6.2	2.0
Responsiveness	6.5	1.8
Enjoyment	6.8	1.6

Table 3
Reactions to All Social Interactions

	Intr	Sex	Body	Social	General	Body Sex	Social Sex	General Sex
Confidence								
Coeff	7.1	.09	.22	.18	.07	.07	.16	.07
<i>t</i>		1.0	2.6	2.2	< 1	< 1	2.0	< 1
<i>p</i>		ns	.01	.03	ns	ns	.05	ns
Influence								
Coeff	6.4	.09	.09	.16	-.02	-.01	.18	.02
<i>t</i>		< 1	< 1	1.9	< 1	< 1	2.1	< 1
<i>p</i>		ns	ns	.06	ns	ns	.05	ns
Intimacy								
Coeff	6.1	.25	.26	.38	-.17	-.12	-.03	-.19
<i>t</i>		2.4	2.5	3.8	1.7	1.2	< 1	1.9
<i>p</i>		.02	.01	.01	.10	ns	ns	.05
Enjoyment								
Coeff	6.8	.02	.06	.01	-.01	.02	.06	-.02
<i>t</i>		< 1	< 1	< 1	< 1	< 1	< 1	< 1
<i>p</i>		ns	ns	ns	ns	ns	ns	ns
Responsiveness								
Coeff	6.4	.15	.04	.14	-.21	.09	.02	.08
<i>t</i>		1.6	< 1	1.6	2.3	< 1	< 1	< 1
<i>p</i>		.11	ns	.11	.05	ns	ns	ns

Note. Column labels: Intr, intercept; Sex, sex main effect; Body, main effect for *Body* factor; Social, main effect for *Social* factor; General, main effect for *General* factor; Body-sex, interaction of participant sex and *Body* factor; Social-sex, interaction of participant sex and *Social* factor; General-sex, interaction of participant sex and *General* factor.

Row labels: Coeff, coefficient (fixed parameter) estimate; *t*, value of *t*-test; *p*, probability that coefficient is not 0.

Table 4
Predicted Confidence and Influence Scores

	Women	Men
Confidence		
High social	7.45	7.02
Low social	6.77	6.98
Influence		
High social	6.84	6.28
Low social	6.16	6.32

Note. High social is a predicted score for a person 1 *SD* above the mean on the Social factor. Low social is a predicted score for a person 1 *SD* below the mean.

was positive for women. These predicted confidence and influence scores are presented in Table 4.

The analyses of the relationship between confidence and the *Body* factor partially confirmed the present hypotheses. As expected, the relationship between confidence and *Body* scores was positive. Every 1.0 increase in participants' *Body* scores was associated with a .18 increase in mean confidence. Nonetheless, the interaction of this factor and participant sex was not significant. The results of these analyses are presented in Table 3.

The analyses of the three measures of the socioemotional dimensions of interaction, intimacy, others' responsiveness, and enjoyment, provided some support for the primary hypotheses of the study, with the strongest support coming from the analysis of intimacy. These results are also presented in Table 3.

As expected, the relationships between intimacy and the *Body* and *Social* factors were positive. Every 1.0 increase in *Body* factor scores was associated with a .26 increase in mean intimacy, and every 1.0 increase in *Social* factor scores was associated with an increase of .38 in mean intimacy, although the interactions of these factors and participant sex were not significant.

The relationship between intimacy and *General* scores was also marginally significant ($p < .10$), although this was qualified by a significant interaction between participant sex and *General* scores. As expected, *General* scores were unrelated to mean intimacy for men, whereas

somewhat contrary to expectation, *General* scores were *negatively* related to mean intimacy for women. The predicted mean intimacy for women who scored 1.0 on the *General* factor was 6.04, whereas the predicted mean intimacy for women who scored -1.0 was 6.76. The predicted mean intimacy for men who scored 1.0 on the *General* factor was 5.88, functionally equivalent to the predicted mean intimacy for men who scored -1.0 of 5.92.

The analyses of enjoyment and responsiveness provided no support for the present hypotheses. None of the relationships between enjoyment of interactions and any of the body evaluation factor scores or the interaction of participant sex and body evaluation were significant (all $ps > .20$). The analysis of others' responsiveness produced only one significant effect, a negative coefficient ($-.21$) for the *General* factor ($t = 2.1$, $p < .05$).⁵

Reactions to Same-, Opposite-, and Mixed-Sex Interactions

Reactions to same-, opposite-, and mixed-sex interactions were examined using an interaction-level model that estimated separate coefficients representing mean ratings for each type of interaction. The sexual composition of an interaction was represented by three dummy-coded variables, one representing same-sex, another opposite, and a third mixed. To analyze mean ratings for each type of interaction, the following zero-intercept model was used:

$$y_{ij} = \beta_{1j} + \beta_{2j} + \beta_{3j} + r_{ij}$$

In this model (referred to as a "Slopes as outcome" model), y_{ij} represented a response, β_{1j} was a random coefficient representing the mean rating for same-sex interactions, β_{2j} represented the mean rating for opposite-sex interactions, and β_{3j} represented the mean rating for mixed-sex interactions. Individual differences in these coefficients were

5. To address concerns about fatigue effects, all analyses were repeated with day of study as a covariate in the level-1 models (interaction and day level models). The results of these analyses were virtually identical to those presented in the paper. Details of these analyses are available from the author.

analyzed using the same person-level model as that used in the *overall* analysis.

These analyses did not find sharp differences across the three types of interactions in the relationships between body evaluation and reactions to social interaction. Some effects that were significant in the *overall* analyses were not significant in the equations predicting ratings across all three, but comparisons across the three sets of coefficients representing the same relationships revealed no significant differences. For example, in the analysis of confidence, the sex-*Social* interaction was significant for same- and mixed-sex interactions, but it was not significant for opposite-sex interactions. Nevertheless, the coefficient representing the sex-*Social* interaction for opposite-sex interactions was not significantly different from the same- and mixed-sex coefficients ($p > .15$), indicating that the sex-*Social* interaction did not differ across the three types of events.

Quantity and Distribution of Social Contact

Quantity of social interaction was conceptualized as a day-level phenomenon. For each day participants maintained the diary, the number of interactions they had and the time they spent in interaction were calculated. One set of measures described all interactions, and other sets described same-, opposite-, and mixed-sex interactions, and another set described interactions that were dyads.

These measures of interaction quantity were analyzed with a two-level HLM in which days were nested within participants. These analyses suggested that body evaluation was not related to day-to-day levels of social activity. There was only one marginally significant effect in these analyses, a positive relationship (31.3) between the *Social* factor and time (in minutes) spent per day in all interactions ($t = 1.9, p < .06$). Participants with higher scores on the *Social* factor tended to spend more time in social interaction each day.

The previous analyses of social activity did not examine how participants distributed their social interactions. For example, were there relationships between body evaluations and the percent of interactions that were opposite-sex? Although there were no hypotheses about such differences, they were examined on an exploratory basis.

Distribution of interactions was conceptualized as an interaction level phenomenon. For each social interaction, dummy-coded variables

represented whether the interaction was a dyad, if all cointeractants were the same sex as the participant, if they were all of the opposite-sex, or if there was a mix of the sexes. These data were analyzed using a two-level HLM in which interactions were nested within participants. The dependent measure was dichotomous (whether or not the interaction was same-sex or not, a dyad or not, etc.), and the interaction-level model was a Bernoulli model with $n = 1$.

$$\text{Prob}(y = 1|\beta_{0j}) = \phi$$

The coefficients from the interaction-level analyses, in this case the log-odds of a particular type of event occurring, were analyzed at the person-level using the same variables as those used in previous analyses. A description of using HLM to analyze binary outcomes can be found in Bryk, Raudenbush, and Congdon (1996, pp. 117–159). In all of these analyses, no effect involving any of the body evaluation factors reached conventional levels of significance, suggesting that how participants distributed their interactions was not related to their body evaluation.

Discriminant Validity of Present Findings

Finding relationships between a measure of specific self-perceptions (such as body image) and a measure of general behavior (such as social interaction) raises questions about the extent to which such relationships are specific to the aspect of self-perception being measured. That is, do the present results reflect underlying relationships between interaction and some sort of general feeling of self-worth, or are they construct specific?

When they completed the BSRQ, participants also completed the Texas Social Behavior Inventory (TSBI; Helmreich, Stapp, & Ervin, 1974), a measure of social self-esteem. Although the focus of the TSBI is not truly global because it primarily concerns social situations, it does concern all types of social events. All the analyses reported above were repeated with TSBI score and the interaction between participant sex and TSBI score entered in the person-level models. Despite the fact that TSBI scores were correlated with *Body* and *Social* factor scores (.27 and .31 respectively), the inclusion of the TSBI and TSBI-sex interaction terms in the analyses did not lead to meaningful changes in the results of the analyses.

DISCUSSION

Previous research has more or less assumed that self-perceptions of body image represent a unidimensional construct; however, the present results suggest that they do not. The body-evaluation subscale of the BSRQ was found to have three factors. The first factor (*Body*) seemed to represent self-perceptions of the attractiveness of one's body per se, with a possible sexual component. Virtually all seven items with large coefficients concerned body appearance, and two of these explicitly concerned sexual attractiveness ("Few people think I have a sexy body" and "I think my body is sexually appealing"), and one concerned evaluation of nudity, a state clearly associated with sexuality ("I like the way I look without my clothes"). The second factor (*Social*) concerned people's perceptions of others' evaluation of their attractiveness, with the use of appearance as a means of social influence as a possible component. Virtually all seven items with large coefficients concerned others' perceptions, and two of these explicitly concerned attractiveness as a method of social influence, "My good looks are advantageous to me," and "If I want to make an impression on someone, I can use my physical appearance to do it." The third factor was the least clear of the three and seemed to represent some form of general appearance self-evaluation.

The present study was not intended to examine the dimensionality of body evaluation, and so the present factorial structure and accompanying interpretations need to be viewed with caution. For example, the present analyses suggest that self-perceived bodily attractiveness and beliefs about others' perceptions of one's attractiveness are relatively independent. Considering that both of these evaluations concern (more or less) the same physical stimulus (a person's physical appearance), such independence requires further validation. Nonetheless, differences in the relationships between these factors and measures of social interaction suggest that the factors represent important and distinct components of body evaluation.

The first hypothesis of the study, that self-evaluations of physical attractiveness would be positively related to reactions to social interaction, was supported by the analyses of intimacy of interaction. For both men and women, self-perceptions of body attractiveness and of how attractive they believed others found them to be were positively related to the intimacy they found in interaction. It should also be noted that the relationship between body evaluation and intimacy was fairly strong. The

full person-level model accounted for 18% of the variance in average intimacy of interactions.

People who perceived their bodies as more attractive and who thought others found them more attractive had more intimate interactions (of all types) than those who perceived themselves as less attractive. A relationship between self-perceptions of attractiveness and intimacy in interactions involving members of the opposite sex is relatively easy to understand because of the likely association between intimacy and opposite-sex contact, perhaps because of the greater potential for sexual activity that accompanies opposite- versus same-sex contact.⁶ Consistent with this reasoning, and in agreement with previous research (Nezlek et al., 1983), opposite-sex interactions were perceived as more intimate than either same- or mixed-sex interactions (6.6 vs. 6.0, and 5.7, $p < .001$). Furthermore, a positive relationship between intimacy and body evaluation may be more understandable if one assumes that the body evaluation factor had a sexual component.

The present results suggest, however, that the positive relationship between self-perceptions of body attractiveness and intimacy characterized same- as well as opposite-sex interactions. Such a broad relationship between intimacy and attractiveness is consistent with the results of Reis et al. (1982), who found a positive correlation between peer ratings of physical attractiveness and intimacy in all types of interaction. Such relationships may reflect the fact beliefs about how attractive one is (both to oneself and to others) are negatively related to perceptions of risk in intimacy, and perceptions of risk in intimacy have been found to be negatively related to intimacy for all types of interactions (Nezlek & Pilkington, 1994).

Individuals who think of their bodies as attractive and who think others find them attractive may be more likely to interact in ways that either elicit or maintain intimacy compared to those who think of their bodies as less attractive and who think others find them unattractive. They may believe that their attractiveness will lead to more reciprocity in intimate exchanges, or they may disclose more to others without a concern for

6. This explanation assumes that participants were heterosexual. Although participants' sexual orientation was not measured explicitly, responses they provided in poststudy interviews suggested that the sample was predominantly, if not exclusively heterosexual. Future research is needed to determine if sexual orientation moderates the relationships found in the present study.

reciprocity. Their positive self-concept in this domain may provide a more secure basis for intimate exchange because they are less worried about what other people may think or do. This rationale is consistent with the negative relationships that have been found between perceptions of risk in intimacy and self-esteem and trust of same-sex others (Pilkington & Richardson, 1988), and with the positive relationships found between body image and various measures of adjustment and well-being (including self-esteem). Nevertheless, this explanation is speculative and requires empirical support.

The second hypothesis of the study, that the relationships between body image and interaction outcomes would be stronger for women than for men, was supported by the analyses of the instrumental dimensions of interaction. Women who believed that others found them more attractive were more confident and perceived themselves as more influential in social encounters compared to women who believed that others found them less attractive, whereas there was no relationship between social attractiveness and instrumentality for men. It should be noted, however, that the relationships between body evaluation and these ratings were not as strong as the relationships found for intimacy. The full person-level model accounted for 9% of the variance in average confidence in interactions and 3% of the variance in average influence.

If one assumes that the social factor represents in part people's beliefs about how much they can use their attractiveness to achieve social goals, this result is consistent with a conclusion reached by Reis et al. (1982). In a study of the relationships between day-to-day social interaction and others' ratings of people's physical attractiveness, Reis et al. concluded that more attractive women tend to rely more on their attractiveness as a means of regulating social interaction than less attractive women, whereas for men, attractiveness is not considered to be a means of regulating social interaction.

Such sex differences can be explained from either a sociocultural or sociobiological (evolutionary) perspective. Although the sociocultural perspective can be defined in various ways, Jackson (1992) suggested that sex differences in social roles and social power may explain sex differences in the correlates of physical attractiveness (and by implication self-perceptions of attractiveness). For example, BarTal and Saxe (1976) suggested that societies value women's physical attractiveness more because physical attractiveness represents a more salient way of evaluating women's role fulfillment than it does for men. The social power

explanation (e.g., Stannard, 1971) assumes that women are denied social power and acquire power by choosing powerful mates, something they use their physical attractiveness to do. In either case, physical attractiveness is more important in the evaluation of women than men.

These sex differences are also consistent with recent research and theory on physical attractiveness that has emphasized an evolutionary perspective. A diverse body of research suggests that physical attractiveness is a more important part of men's evaluations of women than it is of women's evaluations of men (Buss, 1994). Granting this, over time, women may have come to recognize more than men have that others use physical attractiveness to evaluate them, and women may have developed a stronger tendency than men to use physical attractiveness as a social tool because men were responsive to such cues. This rationale is supported by recent research that has found that women tend to use appearance enhancement more than men as a means of influencing others (Buss & Shackelford, 1997; Kyl-Heku & Buss, 1996).

From an evolutionary perspective, it might be expected that such a tendency should be limited to, or more pronounced in, women's interactions with men than in their interactions with women. Nonetheless, a positive relationship between social attractiveness and instrumentality was also found for women's perceptions of interactions with women. Women may believe that because social attractiveness is the key to success with men, that social attractiveness is a means with which they can (or should) evaluate each other. To address such questions more thoroughly, future research may need to examine separately perceptions of same- and opposite-sex social attractiveness.

Regardless of whether the present sex differences can be explained sociobiologically or socioculturally, the present results may help explain some of the inconsistencies in existing research. For example, in her review, Jackson (1992) concluded that "... gender differences in the relationships between body image and self-esteem have been equivocal" (p. 185). The present result suggest that different aspects of body image are related in different ways to different aspects of social experience, and incorporating such a perspective in future research may help explain some of the inconsistencies in previous research.

Most studies have tended to use global measures of body image or measures that have differentiated self-perceptions of different parts of the body. Few, if any, have drawn distinctions emphasizing social attractiveness such as those made here, and it is possible that different

studies have obtained different results because they have measured different aspects of body image. The present results suggest that body self-evaluation is a multidimensional construct and that how attractive others find one to be is one of these dimensions; however, the present study was not designed to investigate this specific possibility, and more research on this topic is needed.

Regardless of how body image has been operationalized in previous research, studies focusing on the relationships between body image and psychological adjustment have not drawn sharp distinctions between the socioemotional and instrumental dimensions, and the present results suggest that such distinctions are important. In the present study, quantity of interaction was unrelated to body image, whereas quality of interaction was. Furthermore, relationships between body image and quality of interaction varied across measures of different qualities of interaction. For example, intimacy of interaction was related to all three dimensions of body image, whereas enjoyment was not related to any.

Null findings raise the possibility of Type II errors. Although determining the power of a hierarchical linear model is quite complex (Kreft and deLeeuw, 1998), a rough estimate of the power of the present design can be made. Relationships between body image and enjoyment and between body image and amount of contact were examined at the person-level. In the present study there were 124 participants, and using traditional OLS analyses, 124 participants would provide a power of approximately .80 to detect a correlation of .25 or greater.

Granting the importance of distinguishing quantity of interaction from reactions to interactions, and distinguishing among different reactions to interactions, it is possible that different studies have obtained different results because they have measured different aspects of psychological functioning or adjustment. The follow-up analyses using the TSBI suggest that although body image and global adjustment may be related, the relationships between body image and other constructs may not overlap with similar relationships between these same constructs and more general measures of adjustment.

The present results leave unanswered various important questions. First, there is the question of causality. Do a woman's feelings of confidence and influence in interaction lead her to believe that others find her attractive (or that she can use her attractiveness to influence others), or is her confidence and perceived influence a result of how attractive she believes others find her to be (or how she believes she can use her

attractiveness), or are such causal relationships reciprocal? Second, there is the question about the explanatory power of the sociobiological and sociocultural approaches, which in many ways complement more than contradict each other. Third, there is the question about psychological constructs that might mediate the relationships between self-perceptions of attractiveness and social experience such as perceptions of risk in intimacy. Fourth, there is the question concerning the extent to which relationships between body image and other constructs reflect relationships between these constructs and general feelings of self-worth.

Clearer answers to such questions may require more controlled laboratory studies and more sophisticated naturalistic studies that examine changes over time. Nonetheless, the present results provide some guidance for the future by suggesting that the relationships between body image and other constructs need to be examined within a multidimensional context.

REFERENCES

- Bales, R. F. (1950). *Interaction process analysis*. Cambridge, MA: Addison-Wesley.
- BarTal, D., & Saxe, L. (1976). Physical attractiveness and its relationship to sex-role stereotyping. *Sex Roles, 2*, 123-133
- Brown, T. A., Cash, T. E., & Mikulka, P. J. (1990). Attitudinal body-image assessment: Factor analysis of the Body Self-Relations Questionnaire. *Journal of Personality Assessment, 55*, 135-144.
- Bryk, A. S., & Raudenbush, S. W. (1992). *Hierarchical linear models*. Newbury Park, CA: Sage Publications.
- Bryk, A. S., Raudenbush, S. W., & Congdon, R. (1996). *HLM*. Chicago, IL: Scientific Software.
- Buss, D. M. (1994). *The evolution of desire*. New York, NY: Basic Books.
- Buss, D. M., & Shackelford, T. D. (1997). From vigilance to violence: Mate retention tactics in married couples. *Journal of Personality and Social Psychology, 72*, 346-61.
- Cash, T. F. (1994). *The Multidimensional Body Self-Relations Questionnaire*. Unpublished manuscript, Old Dominion University, Norfolk, VA.
- Cash, T. F., & Henry, P. E. (1995). Women's body images: The results of a national survey in the U.S.A. *Sex Roles, 33*, 19-28.
- Cliff, N. (1959). Adverbs as multipliers. *Psychological Review, 66*, 27-44.
- Goffman, E. (1971). *Relations in public*. Basic Books: New York.
- Harris, S. M. (1994). Body image attitudes and the psychosocial development of college women. *Journal of Psychology, 129*, 315-329.
- Helmreich, R., Stapp, J., & Ervin, C. (1974). The Texas Social Behavior Inventory (TSBI): An objective measure of self-esteem or social competence. *JSAS Catalog of Selected Documents in Psychology, 4*, 79.

- Jackson, L. A. (1992). *Physical appearance and gender*. Albany: State University of New York Press.
- Jackson, L. A., Sullivan, L. A., & Rostker, R. (1988). Gender, gender role, and body image. *Sex Roles*, **19**, 429–444.
- Jovanovic, J., Lerner, R. M., & Lerner, J. V. (1989). Objective and subjective attractiveness and early adolescent development. *Journal of Adolescence*, **12**, 225–229.
- Kreft, I., & deLeeuw, J. (1998). *Introducing multilevel modeling*. Thousand Oaks, CA: Sage.
- Kyl-Heku, L. M., & Buss, D. M. (1996). Tactics as units of analysis in personality psychology: An illustration using tactics of hierarchy negotiation. *Personality and Individual Differences*, **21**, 497–517.
- Langlois, J. H., & Stephan, C. W. (1981). Beauty and the beast: The role of physical attraction in peer relations and social development. In S. S. Brehm, S. M. Kassin, & S. X. Gibbons (Eds.), *Developmental social psychology* (pp. 152–168). New York: Oxford University Press.
- Marangoni, C., & Ickes, W. (1989). Loneliness: A theoretical review with implications for measurement. *Journal of Social and Personal Relationships*, **6**, 93–128.
- Nezlek, J. B. (1999). *Multilevel random coefficient analyses of event and interval contingent data in social and personality psychology research*. Manuscript under review. College of William & Mary, Williamsburg, VA.
- Nezlek, J. B., Hampton, C., & Shean, G. D. (In press). Clinical depression and everyday social interaction in a community sample. *Journal of Abnormal Psychology*.
- Nezlek, J. B., Imbrie, M., & Shean, G. D. (1994). Depression and everyday social interaction. *Journal of Personality and Social Psychology*, **67**, 1101–1111.
- Nezlek, J. B., & Pilkington, C. J. (1994). Perceptions of risk in intimacy and social participation. *Personal Relationships*, **1**, 45–62.
- Nezlek, J. B., & Wheeler, L. (1984). RIRAP: Rochester interaction record analysis package. *Psychological Documents*, **14**, 6. (Ms. No. 2610).
- Nezlek, J. B., Wheeler, L., & Reis, H. T. (1983). Studies of social participation. In H. T. Reis (Ed.), *Naturalistic approaches to studying social interaction. New directions for methodology of social and behavioral science, no. 15*. San Francisco: Jossey-Bass.
- Noles, S. W., Cash, T. F., & Winstead, B. A. (1985). Body-image, physical attractiveness, and depression. *Journal of Consulting and Clinical Psychology*, **53**, 88–94.
- Pilkington, C. J., & Richardson, D. R. (1988). Perceptions of risk in intimacy. *Journal of Social and Personal Relationships*, **5**, 503–508.
- Pliner, P., Chaiken, S., & Flett, G. L. (1990). Gender differences in concern with body weight and physical appearance over the life span. *Personality and Social Psychology Bulletin*, **16**, 263–273.
- Reis, H. T., Wheeler, L., Spiegel, N., Kernis, M., Nezlek, J. & Perri, M. (1982). Physical attractiveness in social interaction II: Why does appearance affect social experience? *Journal of Personality and Social Psychology*, **43**, 979–996.
- Reis, H. T., & Wheeler, L. (1991). Studying social interaction using the Rochester Interaction Record. In M. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 24, pp. 270–318). Orlando: Academic Press.
- Sorel, G. T., & Nowak, C. G. (1981). The role of physical attractiveness as a contributor to individual development. In R. M. Lerner & N. A. Bush-Rossnagel (Eds.), *Individuals*

- as producers of their development: A life-span perspective* (pp. 389–446). San Diego: Academic Press.
- Spence, J. T. (1984). Masculinity, femininity, and gender-related traits: A conceptual analysis and critique of current research. *Progress in Experimental Personality Research*, **13**, 1–97.
- Stannard, U. (1971). The mask of beauty. In V. Gormick & B. K. Moran (Eds.), *Women in sexist society: Studies in power and powerlessness* (pp. 118–130). New York: Basic Books.
- Thompson, J. K. (1990). *Body image disturbance: Assessment and treatment*. New York: Pergamon.
- Wheeler, L., & Nezlek, J. (1977). Sex differences in social participation. *Journal of Personality and Social Psychology*, **35**, 742–754.
- Wheeler, L., Reis, H., & Nezlek, J. (1983). Loneliness and social interaction. *Journal of Personality and Social Psychology*, **45**, 943–953.
- Winstead, B. A., & Cash, T. F. (1984, March). *Reliability and validity of the Body Self-Relations Questionnaire: A new measure of body image*. Paper presented at the meeting of the Southeastern Psychological Association, New Orleans, LA.