

Causal relationships between perceived social skills and day-to-day social interaction: Extending the sociometer hypothesis

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ABSTRACT

Twice over two years, participants described their day-to-day social interactions for two weeks, and they described their social skills. Within each phase of the study, self-perceived social skills and the quality of social interaction were positively related. Moreover, the results of cross-lagged panel analyses suggested that changes in the quality of day-to-day interaction led to changes in perceived social skills, whereas changes in social skills did not lead to changes in the quality of interaction. In contrast, quantity of interaction and social skills were not related either within or across time. Consistent with some aspects of the sociometer hypothesis, improvements in the quality of people's social interactions led to increases in self-perceived social skills, and declines in the quality of social interactions led to decreases in self-perceived social skills.

KEY WORDS: social interaction • social skills • sociometer

Social skills, defined as people's ability to have satisfying interactions and relationships with others, have received considerable attention from scholars representing a wide variety of disciplines. Given the breadth and depth of this interest, it is surprising that relatively little is known about relationships between people's social skills and naturally occurring, day-to-day social interaction. Much is known about different ways to measure social skills and relationships between social skills and behaviors in rela-

The research described in this article was made possible by a grant from the Fragrance Research Foundation. I am grateful to Glenn Shean for his collaboration in conducting these studies, to Mark Imbrie for his help in gathering the data for the second phase of the study, to Rebecca Plesko for her help in preparing this article, and to Mark Leary and Harry Reis for their comments on drafts of this article. All correspondence concerning this article should be addressed to John B. Nezlek, College of William & Mary, Department of Psychology, PO Box 8795, Williamsburg, VA 23187-8795, USA. [E-mail: jbnzl@wm.edu.] John Harvey was the Action Editor on this article.

tively circumscribed settings, but little is known about relationships between social skills and the broad array of interpersonal contacts that characterize many (if not most) people's lives. Moreover, relatively little is known about causal relationships between social skills and the interaction outcomes they are presumed to influence.

The present study was designed to expand our understanding of social skills by examining the causal relationships between self-perceived social skills and naturally occurring day-to-day social interaction. Twice over two years, participants described their day-to-day social interactions using a variant of the Rochester Interaction Record (RIR; Wheeler & Nezlek, 1977), and they described their social skills. These data were analyzed with a series of structural equation models that provided a basis for making inferences about the relationships between social skills and social interaction.

The present study focused on relationships between social skills and naturally occurring, day-to-day social interaction because of two important limitations of previous research in how social interaction has been measured. Most of the existing research on social skills and social interaction falls into one of two categories: studies of social interaction in controlled, artificial settings such as the laboratory, and studies using global, or relatively undifferentiated reports or proxy measures of social interaction. Although meaningful in their own right, studies of both types leave important questions unanswered.

It may be difficult to generalize the results of clinical or controlled laboratory studies of social skills 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. For example, Jones, Hobbs, and Hockenbury (1982) studied the relationships between loneliness and social skills within the context of a brief dyadic interaction with an opposite-sex stranger. It can not be assumed that the same relationships they found would be found in interactions with same-sex others or with friends.

The potential limitation of studies using global or undifferentiated measures or proxy measures of interaction is that they may not be sensitive to potentially important differences among types or characteristics of interactions. For example, Riggio, Watring, and Throckmorton (1993) and Spitzberg and Hurt (1987) found negative relationships between social skills and loneliness. Other research, using measures of naturally occurring, day-to-day social interaction, has found, however, that relationships between loneliness and social interaction can vary as a function of whether same- or opposite-sex interactions are being considered (Wheeler, Reis, & Nezlek, 1983). These results suggest that relationships between social skills and day-to-day social interaction might vary across same- and opposite-sex interactions, a difference that cannot be examined using measures that do not distinguish between these types of interactions.

Day-to-day social interaction was measured using the RIR because it provides both finely differentiated and broad-based measures of day-to-day

social interaction. The RIR provides separate measures of interaction quantity and reactions to interactions, which allowed relationships between social skills and the quantity of interaction to be examined separately from relationships between skills and reactions to interaction. In addition, the RIR provides descriptions of different types of social interaction, for example interactions with same- versus opposite-sex others, allowing separate analyses of relationships between social skills and interaction across social domains.

The study was guided by one primary hypothesis and one research question. The primary hypothesis was that social skills would be positively related to the quality of participants' social interactions, but would be unrelated to the quantity of interaction. Previous research suggests that psychological adjustment (operationalized in various ways) is more closely related to the quality of people's social lives than to how socially active they are per se (e.g., Marangoni & Ickes, 1989; Nezlek, 2000). In light of this and the research demonstrating positive relationships between social skills and psychological adjustment (Spitzberg & Cupach, 1989), it was expected that social skills would be related to the quality of people's interactions, but would not be related to the quantity of their social interaction.

The primary research question concerned causal relationships between social skills and social interaction. The study was a two-wave panel design, and analyses of such data structures can compare the strength of the causal sequences linking two constructs, a sequence from skills to interactions and one from interaction to skills. Within the present context, these two causal sequences were presumed to reflect the operation of two different types of processes. For present purposes, a casual sequence from social skills to social interaction was assumed to represent what was labeled an endogenous model. This label was chosen because such a sequence represented the influence of an endogenous characteristic (perceived social skill) on an exogenous characteristic (social interaction). In contrast, a casual sequence from social interaction to social skills was assumed to represent what was labeled an exogenous model, because such a sequence represented the influence of an exogenous characteristic (social interaction) on an endogenous characteristic (social skill). Although it could be argued that reactions to social interactions are endogenous in that reactions exist within individuals, the label exogenous was used to represent the relative importance of internal and external factors. That is, self-perceptions of social skills are self-evaluations that are phenomenologically self-focused. In contrast, reactions to social interaction explicitly focus on external stimuli (other people and their behavior).

Understanding the causal relationships between endogenous characteristics such as individual differences in personality traits and exogenous characteristics such as social behaviors is one of the enduring (and important) goals of social science research and theory. Although there is no consensus among social scientists regarding the causal precedence of endogenous and exogenous characteristics, many models assume (at least implicitly) that endogenous characteristics, such as personality traits, cause

or influence exogenously visible conditions such as interpersonal behavior (e.g., Leary, 1999). For example, an endogenous characteristic such as social skills has frequently been thought to influence the quality of an exogenous condition such as interpersonal behavior, and such an assumption underlies many attempts to improve people's lives by enhancing qualities such as social skills or self-esteem (e.g., Leary, 1999).

Nonetheless, many social scientists would also argue for the opposite causal relationship, for example, that the quality of people's social lives might affect their self-evaluations, and such causal relationships are part of numerous models and theories, including Bandura's (1986) model of self-efficacy. Within Bandura's framework, people receive feedback from the environment (an exogenous entity), and their self-evaluations (an endogenous entity) change in response. More specifically, more successful social interactions might lead people to perceive themselves as more socially skilled.

Within the contemporary milieu, one of the most interesting of the theories suggesting an exogenous causal sequence is the sociometer hypothesis (Leary, Tambor, Terdal, & Downs, 1995). The sociometer hypothesis assumes that individual differences in socially focused, self-evaluations (specifically self-esteem) reflect how fully people are accepted by their social groups. In terms of causal relationships between endogenous and exogenous constructs, this implies that changes in an exogenous condition (relations with the group) lead to changes in an endogenous characteristic (self-esteem), a causal relationship opposite to that implicitly assumed by many theorists. A more detailed discussion of the causal relationships between self-esteem and interpersonal behaviors can be found in Leary (1999). Moreover, the sociometer hypothesis's emphasis on self-evaluation fits well with the self-evaluative focus of the measures of social skills used in the present study. Although various other methods can be used, much of the research on social skills relies on self-report measures of social skill, and the present study was intended to complement and expand our understanding of the meaning of such self-reports.

Theoretically, both endogenous and exogenous causal sequences are plausible, and this ambiguity, in combination with the lack of research directly addressing such issues, made it difficult to form a clear hypothesis about which of the two models would be more accurate. In light of this, the study was primarily concerned with comparing the explanatory power of the two models. Relationships between social skills and day-to-day social interaction were examined using structural equation modeling (EQS; Bentler, 1989). In these analyses, social skills and measures of social interaction quality and quantity were modeled as observed measures of latent factors. Structural equation modeling was used because it provides more reliable and accurate tests of relationships than traditional ordinary-least-squares procedures.

Method

Participants

Participants were students at the College of William & Mary. During their first year, they were recruited from introductory psychology classes after they had indicated that they were interested in participating in a study on social interaction. During the second semester of their first year, 124 (66 women and 58 men) participated in the first phase of the study (T1). During the second semester of their junior year, these students were asked if they would be willing to maintain the social interaction diary again. Of the 109 students who were still enrolled, 86 agreed to maintain the diary, and, of these, 83 (51 women, 32 men) provided valid diaries (T2). During both phases, participants were paid \$20, and this article presents results only from those participants who provided data during both phases of the study.

The specific times for the study were chosen based on prior research and the general life-cycle of a student. Second semesters rather than first semester were chosen based on previous research suggesting that social interaction tends to stabilize over the time people spend in a particular environment (Nezlek, 1993). The specific years (first and third) were chosen to represent the early and later parts of participants' social lives in the institution. It could be argued that the fourth (last) year should have been used to represent the later part of the social life cycle, but fourth year students have numerous demands placed on them (job interviews, etc.) that disrupt their naturally occurring interactions.

Procedure

During both phases of the study, social interaction was measured using a variant of the Rochester Interaction Record (RIR; Wheeler & Nezlek, 1977), a self-report diary used to describe day-to-day social interaction, and the procedure was similar for both phases of the study. At the beginning of each phase of the study, participants attended an introductory meeting during which the importance of understanding social interaction was explained, and their role as collaborators in this naturalistic research was emphasized. They were told that the study concerned people's patterns of social interaction, that they would use a structured diary form to describe their social interactions, and that they would be paid \$20 for their cooperation.

Instructions were modeled 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. 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 (e.g., a conversation, dancing) and what was not an interaction (e.g., simply sitting next to someone in a lecture). The various response categories on the RIR were discussed until participants understood their definitions and felt comfortable with the forms and the procedure.

Similar to most studies using the RIR, participants described the social interactions they had by indicating the date and time the interaction began, its length, and who their co-interactants were, using unique initials for each co-interactant and indicating the sex of each co-interactant. For group interactions, participants did not record individual initials; they indicated how many men and

women were present. In Phase 1, group interactions were defined as interactions with four or more others, allowing participants to record up to four sets of initials. Analyses of these data revealed that very few interactions (4%) involved four others, and so, in Phase 2, participants were asked to record the initials of up to only three different co-interactants. Therefore, in Phase 2, group interactions were designated as interactions with three or more others, the operationalization used in most previous RIR research. Participants also rated each interaction on five dimensions, intimacy, enjoyment, other's responsiveness, confidence, and influence. Ratings were made using 9-point scales with the following labels: 1 = *not*, 3 = *slightly*, 5 = *somewhat*, 7 = *quite*, and 9 = *very*. These labels were chosen to represent roughly equal intervals according to research by Cliff (1959) on the relative strength of modifiers.

The definitions of these dimensions were similar to those used in past research. Enjoyment was defined as how pleasurable or satisfying an interaction was. Intimacy was defined as how interpersonally close an individual felt to his or her co-interactants, with specific mention that intimacy did not have to include a sexual component. 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 an individual controlled the interaction (e.g., initiation, determining what was to be done, where to go), and confidence was defined as 'how self-assured you were and how competent you felt.'

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

At the conclusion of each record-keeping period, participants were interviewed individually about the difficulties, ambiguities, and potential sources of inaccuracy in their data. Participants were encouraged to be candid when describing how they maintained the diary, and they were told that they would be paid regardless of what they said about how they had maintained their diaries. Based on these interviews, the data of three participants were discarded from the T2 sample. Following these interviews, participants completed the Social Skills Inventory (SSI; Riggio, 1986, 1989), they were paid, and questions they had about the study were answered. Three participants did not complete the SSI at both T1 and T2, and they were dropped from the analyses, leaving a total of 79 participants in the final sample.

The remaining participants maintained their diaries a mean of 16.3 days (T1) and 16.7 days (T2). Across both phases of the study, participants reported updating their diaries a mean of 1.8 times per day and spending a mean of 15 minutes per day doing this. For both phases of the study, participants' answers to questions about how they maintained the diary (perceived accuracy, difficulty, etc.) were very similar to those given by participants in other RIR studies (cf. Nezlek, Wheeler, & Reis, 1983). Participants' reports strongly suggested that they 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.

Results

Development of measures

Participants' day-to-day social interactions were represented by summary measures describing reactions to interactions and quantity of interaction. Three sets of summary measures were used, and identical sets of measures were calculated for the two phases of the study. The first set of measures described all of a participant's interactions (overall), the second set described interactions involving only same-sex others (same-sex), and the third set described only opposite-sex interactions (opposite-sex).

Reactions to interaction were represented by mean ratings for the five scales of intimacy, enjoyment, responsiveness, confidence, and influence. Interaction quantity was operationalized as the mean number of interactions per day, the mean time per day spent in interaction (in minutes), the number of different same- and opposite-sex people mentioned in the diary (adjusted for the number of days the diary was maintained), and the percentage of interactions that were same- and opposite-sex interactions. These interaction summary measures were calculated using a set of programs written specifically to summarize data generated by the RIR (Nezlek & Wheeler, 1984). See Wheeler and Nezlek (1977) for a discussion of the analytic framework used as the basis for these procedures. The SSI has six subscales, Emotional Expressivity, Emotional Sensitivity, Emotional Control, Social Expressivity, Social Sensitivity, and Social Control, which were scored according to the protocol provided by Riggio (1986, 1989).

As noted earlier, for various reasons, only 79 of the original 124 participants were included in the analyses across the two periods. Such attrition raises questions about differences between those who were included in the final analyses and those who were not. To address such questions, the T1 measures of those who were included and those who were excluded were compared. These analyses found no significant differences in social skills at T1 and no significant differences in the quality of social interaction at T1, although there were some differences in quantity of social interaction between the two groups. Those who contributed data at both phases reported more interactions per day ($p < .01$) and more time per day spent in interaction ($p < .01$) at T1 than those who dropped out of the study. There were no differences, however, in the number of same- or opposite-sex persons mentioned in the diary.

Overview of analyses

Relationships between social skills and day-to-day social interaction were examined using structural equation modeling. The five measures of reactions to interaction were conceptualized as measures of a single latent construct, Quality, and measures of the quantity of interaction were conceptualized as measures of a single latent construct, Quantity. In keeping with recent research using the SSI (Riggio, Messamer, & Throckmorton, 1991; Riggio et al., 1993), the six subscales of the SSI were conceptualized as measures of a single latent factor, Skill. Relationships between social skills and interaction quality and between social skills and interaction quantity were examined separately.

Measurement model

Before examining the relationships among the latent constructs, the adequacy of the measurement of each construct was examined with a confirmatory factor analysis (CFA). For each construct, for both phases of the study, the fit between

the data and a single factor model was evaluated using EQS (Bentler, 1989). Consistent with the recommendation of Bentler (1988), fits were evaluated using the comparative fit index (CFI).

The initial analyses of the six subscales of the SSI suggested that they were not observed measures of a single latent construct at either T1 or T2. Analysis of the SSI collected at T1 produced a CFI of .61, and analysis of the SSI at T2 produced a CFI of .64. In both analyses, the coefficients for the Emotional Control and Social Sensitivity subscales were not significantly different from 0, and, in light of this, these subscales were dropped from the analysis. The finding that the EC and SS subscales did not have significant coefficients on this factor is consistent with the results of Riggio, Throckmorton, and DePaola (1990). In a study of the relationships between social skill and psychological well-being, they found generally positive relationships between well-being and the Emotional Expressivity, Emotional Sensitivity, Social Expressivity, and Social Control subscales, and either no relationships or negative relationships between well-being and the EC and SS subscales. Analyses of the Emotional Expressivity, Emotional Sensitivity, Social Expressivity, and Social Control subscales indicated that they were observed measures of a single factor at both T1 and T2. The CFIs were .96 and .95, respectively.

As expected, the analysis indicated that the five measures of reactions to interaction were observed measures of a single factor at both T1 and T2. The analysis of the measures describing all social interactions at T1 produced a CFI of .95, and the analysis of the T2 measures produced a CFI of .99. Moreover, the analyses of the measures describing only same-sex interactions and only opposite-sex interactions also produced acceptable CFIs (above .92) at both T1 and T2. For all these analyses, the factor loading for each individual variable was significant ($ps < .01$).

The analyses suggested that the four measures of quantity of social interaction (number per day, time per day, number of same- and opposite-sex interactants) were observed measures of a single factor at both T1 and T2, although the fits were not as strong as they were for the other analyses. Analysis of the measures describing all social interactions at T1 produced a CFI of .85, and analysis of the T2 measures produced a CFI of .91. In each of these analyses, the factor loading for each individual variable was significant ($ps < .01$).

In these and all other analyses of interaction quantity, various combinations of the four measures of quantity were modeled as observed measures of the latent construct. Loadings from the analyses using all four variables are presented here, although analyses using any subset of these four led to the same conclusions as those presented in this article. Analyses of measures describing only same-sex and only opposite-sex interactions (per day, time per day, number of interactants, and percentage of interactions) also produced acceptable CFIs at both T1 and T2 (same-sex, .88 and .94, respectively; opposite-sex, .98 and .94, respectively).

The coefficients (factor loadings) for individual items from the analysis of measures of *overall* interaction and the analysis of the SSI are presented in Table 1. The coefficients produced by the analyses of same- and opposite-sex interaction are not presented because they were very similar to the coefficients from the analysis of the overall measures.

Static (within-phase) relationships

The first hypothesis of the study was that social skills and quality of social

TABLE 1
Coefficients of observed measures of latent constructs and fit indices
(all interactions)

	T1	T2
<i>Quality of interaction</i>		
Enjoyment	.85	.86
Influence	.87	.92
Intimacy	.62	.76
Responsiveness	.73	.88
Confidence	.84	.90
CFI	.95	.99
<i>Quantity of interaction</i>		
Interactions per day	.57	.58
Time per day	1.0	1.0
Number of same-sex others	.79	.76
Number of opposite-sex others	.19	.46
CFI	.85	.91
<i>Social skills</i>		
Emotional expressivity	.54	.59
Emotional sensitivity	.60	.44
Social expressivity	.97	.97
Social control	.73	.74
CFI	.96	.95

Note. T1 = Time 1; T2 = Time 2.

interaction would be positively related. This hypothesis was tested using CFAs in which the covariation between the latent constructs of Skill and Quality was modeled, separately for both T1 and T2. The results of these analyses are summarized in Table 2.

In confirmation of the first hypothesis, there were positive relationships between social skill and interaction quality at both T1 and T2 for measures of overall, same-, and opposite-sex interaction. Compared with participants with

TABLE 2
Static (within-phase) relationships between social interaction and social skills:
Fit indices and estimated correlations

	T1		T2	
	CFI	r	CFI	r
<i>Quality of interaction</i>				
Overall	.97	.36*	.97	.38*
Same-sex	.98	.36*	.97	.38*
Opposite-sex	.93	.28*	.98	.39*
<i>Quantity of interaction</i>				
Overall	.97	.21	.84	.19
Same-sex	.92	.14	.93	.04
Opposite-sex	.96	.10	.95	.10

Note. T1 = Time 1; T2 = Time 2.

* $p < .05$.

lower self-perceived social skills, participants who had higher self-perceived social skills found their interactions to be more intimate and satisfying, felt more confident and influential in interactions, and felt that other people were more responsive to them. Moreover, and as expected, there were no relationships between social skill and interaction quantity at either T1 or T2 for measures of overall, same-, and opposite-sex interaction. The results of these analyses are also summarized in Table 2.

Relationships across time

Although the primary focus of the present study is the relationship between perceived social skill and social interaction, relationships between these two constructs across time should be evaluated within a context that includes how these constructs themselves change (or remain the same) across time. Moreover, it is useful to examine the stability across two years of measures of both constructs to complement and extend existing research. Previous research has measured the stability of social skills over relatively brief periods, such as two weeks (Riggio, 1986) and four months (Segrin, 1993); however, no previous study has examined its stability over a period as long as two years. The stability of social interaction has been examined over various periods ranging from 2 to 6 months (Nezlek, 1993) and from 6 to 11 years (Reis, Lin, Bennett, & Nezlek, 1993); however, the stability of day-to-day social interaction within the same environment for a period over six months has not been examined. The Reis et al. (1993) study compared interactions people had while in college to interactions they had as adults residing in the general community.

Stability of constructs

The stability across time of each construct was examined absolutely and relatively (Nezlek, 1993). Absolute stability was operationalized in terms of the similarity of means across time, and differences between these means were examined with repeated measures ANOVAs. Relative stability was operationalized as the correlation between measures taken at T1 and T2. The results of these analyses are summarized in Table 3.

These analyses found that all three sets of measures, quality and quantity of social interaction and social skills, were absolutely stable across the two years of the study. For quality of interaction, there was only one significant mean difference across the two periods, a small decrease in enjoyment, and, for social skill, there was a statistically significant, but small, increase in scores on the Social Control subscale. There were no significant (or near significant) changes in measures of quantity of interaction.

Correlations between measures across the two periods suggested that the three sets of measures were fairly stable relatively, although not equally so. Measures of social skills were the most relatively stable, with stability coefficients between .75 and .90. Measures of social interaction were somewhat less stable. Stability coefficients for measures of interaction quality were between .62 and .72, and coefficients for three of the four measures of interaction quantity were just above .5.

Taken together, these analyses suggest that, although there were no changes in mean levels of these measures, there was some instability in terms of relative quality and quantity of social interaction and, to a lesser extent, social skill. As a group, participants did not have more or less rewarding interactions or fewer or more interactions, nor did their social skills change. Nevertheless, there was

TABLE 3
Absolute and relative stability of measures

	Means		<i>r</i>
	T1	T2	
<i>Quality of interaction</i>			
Enjoyment	6.8 (.7)	6.6* (.8)	.72
Influence	6.5 (1.0)	6.6 (.9)	.69
Intimacy	6.2 (1.1)	6.3 (.9)	.64
Responsiveness	6.5 (.9)	6.6 (.8)	.62
Confidence	7.1 (1.0)	7.1 (.7)	.70
<i>Quantity of interaction</i>			
Interactions per day	6.0 (2.0)	5.7 (1.6)	.53
Time per day (minutes)	381 (117)	362 (113)	.52
Number same-sex others	1.0 (.5)	1.0 (.5)	.54
Number opposite-sex others	.7 (.4)	.7 (.3)	.31
<i>Social skills</i>			
Emotional expressivity	82 (14)	81 (15)	.77
Emotional sensitivity	94 (13)	95 (13)	.79
Social expressivity	83 (21)	85 (20)	.81
Social control	86 (16)	89* (16)	.87

Note. T1 = Time 1; T2 = Time 2. Standard deviations are in parentheses.

* T2 mean was significantly ($p < .05$) different from corresponding T1 mean.

sufficient instability in these measures to suggest that meaningful changes had occurred across time. Some people who were more active at T1 were less active at T2 and so forth.

Causal relationships

The causal relationships between social interaction and social skills were examined separately for measures of all interactions and for measures of same- and opposite-sex interactions. Moreover, within each set, interaction quality and quantity were analyzed separately. The primary analyses were two-wave panel designs similar to those used by Bentler and Speckart (1981) in a study of attitude-behavior relationships and by Cole, Martin, Powers, and Truglio (1996) in a study of depression and social competence.

In these models, the covariation between interaction measures and social skills at T1 and between the same constructs across time was modeled. Causal relationships between social skills and interaction measures were represented by lagged coefficients between the two constructs across time. For example, a causal relationship leading from interaction to skills would be indicated by a significant lagged coefficient between interaction at T1 and skills at T2. To avoid identification problems, the direct covariation between interaction measures and social skills was not modeled at T2, although the covariation between disturbance (error) terms was.

Quality-skill causal relationships. The model relating social skill and overall measures of interaction quality produced a CFI of .94, indicating a good fit between the model and the data. The models relating social skill and measures of the quality of same- and opposite-sex interactions produced similar results. Each produced a CFI of .94.

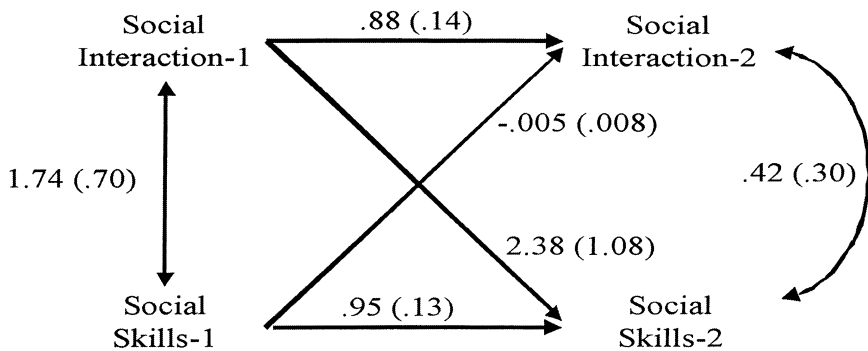
In terms of the hypothesis regarding causal relationships, the results of the analysis of the quality of all interactions clearly supported an *exogenous* model. Changes in the quality of social interaction led to changes in social skills, whereas changes in social skills were not related to changes in the quality of social interaction. The lagged coefficient from Quality 1 to Skill 2 was significantly different from 0 (2.38, $z = 2.2$, $p < .05$), whereas the coefficient from Skill 1 to Quality 2 was not ($-.005$, $z = .66$, *ns*). The model (including the coefficients and their error terms) is presented in Figure 1.

Another, stronger, test of the differences between two lagged coefficients consists of a comparison of the goodness-of-fit of a model in which the two coefficients are constrained to be equal to the goodness-of-fit of a model in which they are allowed to vary (i.e., the model just presented). Such a constrained model did not fit the data as well as the unconstrained model $\chi^2(1, N = 179) = 5.0$, $p < .05$, indicating that the two lagged coefficients were significantly different.

The models relating social skill and quality of same- and opposite-sex interactions suggested the same causal sequence. Analyses of the quality of same-sex interactions found that the lagged coefficient from Quality 1 to Skill 2 was significant (1.92, $z = 2.0$, $p < .05$), whereas the Skill 1–Quality 2 coefficient was not ($-.01$, $z = 1.1$, *ns*). Similarly, analyses of the quality of opposite-sex interactions found that the lagged coefficient from Quality 1 to Skill 2 was significant (2.14, $z = 2.3$, $p < .05$), whereas the Skill 1–Quality 2 coefficient was not (.01, $z = 1.0$, *ns*). Furthermore, for analyses of both same- and opposite-sex interactions, models in which the two lagged coefficients were constrained to be equal did not fit the data as well as models in which these coefficients were not constrained (both $ps < .05$). Finally, it is important to note that the static relationships between social skills and interaction quality at T1 were not significantly different from the lagged relationship between quality at T1 and skills at T2.

It is also important to note that the analyses provided no support for the endogenous model, a causal sequence from skills to interaction quality. In all three analyses, the coefficient from skills to interaction quality was not significantly different from 0, and this coefficient was significantly less than the coefficient from interaction to skills.

FIGURE 1
Causal relationships between quality of interaction and perceived social skills



Note. For T2 measures, the covariance between disturbance terms was modeled.

Quantity–skill causal relationships. Relationships between the quantity of social interaction and social skills were examined with a set of models similar to those described earlier. As expected, and consistent with the results of the analyses of static relationships, the results of these analyses suggested that there was no causal relationship between social skill and the quantity of social interaction.

The overall model produced a CFI of .82, and a fit of this size makes the interpretation of individual coefficients somewhat ambiguous. Nonetheless, significance tests of neither of the lagged coefficients between Quantity and Skill approached conventional levels of significance. The same-sex model produced a CFI of .96, and, again, neither of the lagged coefficients was significantly different from 0. Finally, the opposite-sex model produced a CFI of .87, and, again, neither of the lagged coefficients was significantly different from 0.

Discussion

The present results clearly supported the primary hypothesis of the study. Social skills were positively related to the quality of people's day-to-day social interactions and were unrelated to the quantity of interaction. The positive relationship between skills and quality is consistent with considerable research on the positive correlates of social skills. In contrast, the lack of relationships between skills and quantity is difficult to place in context because relatively little research has examined such relationships using measures of interaction quantity as detailed as those used in this study.

Nevertheless, the lack of quantity–skill relationships is consistent with a growing body of research concerning relationships between social interaction and various measures of psychological functioning. For example, in a study of collegians, Nezelek, Imbrie, and Shean (1994) found negative relationships between depressive symptoms and the quality of social interaction, but no relationships between symptoms and interaction quantity. These findings were replicated by Nezelek, Hampton, and Shean (2000) in a study of the interactions of adults residing in the community, half of whom met DSM criteria for clinical depression and half of whom presented no psychological problems. Nezelek et al. (2000) found that the interactions of depressed adults were less rewarding than the interactions of non-depressed adults, but there were no differences between the two groups in the quantity of social interaction. Similarly, Nezelek and Reis (1999), in a study of adults residing in the community, found negative relationships between the quality of interaction and a multivariate measure of psychological functioning, but found no relationship between functioning and the quantity of interaction.

A possible explanation for such differences in relationships between measures of psychological functioning and interaction quantity and relationships between functioning and quality was offered by Nezelek (2000). Nezelek argued that quantity and quality of interaction reflect the operation of somewhat different systems. Interaction quantity (i.e., how socially active people are and how they distribute these activities) is part of a more

cognitively focused system than interaction quality. With whom people spend time and how much time they spend with them, even what people do with each other, may primarily reflect role and normative demands or the need to fulfill personal plans and commitments. In contrast, the quality of interaction (the affective rewards people derive from interaction) is part of a more affectively focused system that is tied more closely to people's psychological functioning. This argument can be readily extended to the present findings about social skills. If the quantity of interaction involves systems that are not as germane to psychological functioning as systems involved with the quality of interaction, changes in quantity should not be related to changes in skills. In contrast, if the quality of interaction involves systems that are more germane to psychological functioning, changes in quality should be related more closely to changes in skills than changes in quantity.

In terms of the primary research question of the study, the results clearly supported an exogenous model. Changes in social interaction (an exogenous construct) predicted changes in self-perceived social skill (an endogenous construct), whereas changes in social skills did not predict changes in the quality of social interaction. Although the sociometer hypothesis as originally stated focuses on relationships between self-esteem and social acceptance (Leary et al., 1995), the causal relationships found in this study are consistent with this hypothesis if one makes two fairly plausible assumptions.

The first assumption is that the reactions to social interaction measured in the present study constitute measures of social acceptance. Although the construct of social acceptance has not been formally defined, measures of interaction such as how responsive others were to one's needs and how intimate (personally close) people felt to others would seem to be reasonable candidates to be observed measures of this construct. The second assumption is that measures of social skills (such as the SSI) have important self-evaluative components and as such reflect individual differences in self-esteem (at least in part). Such a conceptualization is consistent with the conclusion of Spitzberg and Cupach (1989), who commented that '... global self-reports of interpersonal competence may actually represent one's self-perceived confidence or social *self-esteem*' (p. 58, emphasis added). Clearly, studies using more direct measures of the two constructs that constitute the basis of the sociometer hypothesis are needed to examine such relationships more explicitly. Nevertheless, the present results provide indirect support for the general mechanism underlying the sociometer hypothesis.

The present results can also be explained within frameworks other than a sociometric model. One such alternative relies on the classic explanation offered by Bem (1967) for attitude change following counter-attitudinal advocacy. Just as Bem suggested that people may observe their own behaviors and make inferences about their attitudes, people may make inferences about their social skills by observing how successful they are in social interaction. Within such a framework, more success (more rewarding interactions) could lead people to infer that they were more skilled. Furthermore,

if, as suggested by Taylor (1975), such self-perceptual tendencies are stronger if people do not have a clear sense of their attitudes, such a tendency might be pronounced for judgments of social skills. It may be particularly difficult for people to make unambiguous judgments about their social skills because it is difficult for them to observe themselves. To a degree, people are limited to making inferences about their skills based on the effects of their actions on others.

Another, similar alternative relies on Bandura's work on self-efficacy (Bandura, 1986). Within his model, people's sense of competence (efficacy) reflects the feedback they get from their environments. More rewarding interactions at T1 may have led to a greater sense of self-efficacy (self-perceived social skill) at T2. Conversely, less rewarding interactions at T1 may have led people to doubt themselves, leading to a diminished sense of self-efficacy at T2. Admittedly, the two years between assessments in the present study may be longer than the feedback loops envisioned by Bandura. Nonetheless, it is possible that the rewards people derived from interactions at T1 may have initiated a process that produced outcomes that were visible at T2.

The foregoing arguments have assumed that people generally rely on some sort of self-perceptual process to make judgments about their social skills. Nevertheless, there may be large individual differences in how certain people are of their skills. Some people may be fairly certain of their abilities and be less likely to exhibit the types of changes just discussed, whereas others might be less certain and be more likely to exhibit these changes. Future research will need to address such issues.

Yet another perspective on the present results relying on some sort of feedback system can be found in Segrin (1993). Segrin suggested that poor social interaction may result in the atrophy of social skills. People who have unrewarding interactions may not try to improve this situation, withdrawing in some sense from interaction. Although the lack of relationships between social skill and quantity of interaction suggests that such withdrawal is more psychological than physical, such a process is consistent with the present results.

Finally, it is important to consider the generalizability of the present results. First, there is the general issue of making causal inferences based on correlational data. Although researchers are using correlational data to make causal inferences with increasing frequency, it would be best if the present results were complemented by results from a more traditional experimental study. Second, the study examined the social skills of young adults, individuals for whom social skills may not be fully developed. If the social skills of young adults are more malleable than those of other populations (e.g., mature adults), studies of other populations might find different relationships between social skills and social interaction.

Perhaps the most important limitations of the present study concern the level of analysis used to examine causal relationships and the period over which these relationships were examined. The present analysis intentionally focused on relationships among constructs measured at the person level.

Relationships at other levels (such as the individual interaction) are mathematically distinct from relationships at the person level (i.e., the variances are independent) and may be conceptually distinct also. For example, at the level of the individual social interaction, an endogenous characteristic such as social skill might cause exogenous outcomes such as pleasantness of interaction. The present study was not designed to investigate relationships at such levels of analysis, and future research will need to address such issues.

Similarly, casual relationships assessed over two years may not be the same as those that occur over other (shorter) periods. As introduced by Leary et al. (1995), the sociometer is intended to provide feedback that allows individuals to monitor how they are being accepted by their social groups and to make changes accordingly. Moreover, there is an implied immediacy to this process that suggests an unfolding of causal relationships over a shorter period than the two years examined in the present study. Regardless, people may receive feedback from their environments that changes their self-evaluations, but they may not change their behavior in ways that change the feedback they receive. They may not know how or what to change, nor, despite the purported strength of the need to belong, they may not want to change. The primary function of the sociometer is to provide a measure of social acceptance, and such feedback does not necessarily prescribe ways to increase acceptance when people are feeling rejected.

It is also possible that different sociometric mechanisms may operate at different levels of analysis and across different periods. The types of feedback and changes that occur within an interaction may be different from the feedback and changes that occur across lengthier periods and across multiple events. For example, people may be able to alter their behavior more easily in the short-term than in the long-term. Given its newness, the sociometer is not well understood, and more research is needed to understand how this potentially powerful process operates in the myriad of contexts in which it would seem to be important.

Despite its limitations, the present study is the first to examine relationships between social skills and day-to-day interaction, including causal relationships between these constructs. The present results suggest that relationships between skills and interaction vary as a function of the characteristic of interaction being considered (quality or quantity) and that future researchers need to be mindful of the specificity with which they measure social interaction when studying relationships between social skills and social interaction.

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