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Social Skills and the Stress-Protective Role of Social Support

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Cross-sectional analyses of data collected from a large sample of incoming college freshmen were used to determine (a) whether the perceived availability of social support protects persons from stress-induced depressive affect; (b) whether social competence, social anxiety, and self-disclosure are responsible for the stress-protective effect of perceived social support; and (c) whether these social skill measures discriminate among persons for whom support will help, hinder, or be ineffective in the face of stress. Prospective analyses based on the original testing (beginning of school year) and 11- and 22-week follow-ups of a randomly selected subsample were used to determine how the same social skill factors influence the development and maintenance of support perceptions and of friendships. Evidence is provided for a stress-buffering role of the perceived availability of social support. The stress-buffering effect is unaffected by controls for the possible stress-protective influences of social anxiety, social competence, and self-disclosure. Although these social skill factors do not discriminate among persons for whom support will help, hinder, or be ineffective, they are prospectively predictive of the development of both social support and friendship formation. These prospective relations between social skills and the development of perceived availability of social support are only partly mediated by number of friends.

Research on psychological symptomatology suggests that the perception that others will provide needed aid helps to protect people from the pathogenic effects of stressful events (see reviews by S. Cohen & Wills, 1985; Kessler & McLeod, 1985; Leavy, 1983). Specifically, stress is positively associated with psychological symptomatology under low levels of social support, but unassociated (or less strongly associated) under high levels of support. Recent discussions of this literature have focused on the possible importance of stable individual differences in social skills in influencing or even accounting for the support-buffering effect (S. Cohen & Syme, 1985; Gottlieb, 1985; Hansson, Jones, & Carpenter, 1984; Heller, 1979; Henderson, Byrne, & Duncan-Jones, 1981). Three independent questions have been raised. First, does social support merely serve as a proxy for stable individual differences in social skills such as social competence, social anxiety, and self-disclosure? Second, is social support only useful for persons with particular social skills? Third, do social skills play a role in the development of support perceptions?

Is social support a proxy for stable social skills? Because existing research on the relationship between social support and psychological symptoms is almost entirely correlational, it is possible that stable individual difference factors account for changes both in social support and well-being. For example, Heller (1979; Heller & Swindle, 1983) suggested that the apparent stress-protective role of social support may be attributable to higher levels of social competence among persons with high levels of social support. Socially competent persons are assumed to be capable of both coping with stressful events and attracting and maintaining social support. Similar arguments can be made in regard to other measures of social skills such as social anxiety and self-disclosure.

In addition to the scientific importance of the possibility that support measures are merely proxies for social skills, Kiesler (1985) noted that the role of stable individual factors in this process needs to be resolved before social support research can influence public policy. If personality and not social support protects persons from stress-induced pathology, then social support interventions would be fruitless. Our first goal is to determine whether the stress-buffering effects of social support found in previous research can be attributed to social skills. Specifically, we examine the roles of social competence, social anxiety, and self-disclosure, which are social skills that may be central in the ability to cope with stressful events.

Recently researchers have found that some perceived social resources (or functions) are effective in buffering stress-induced psychological symptomatology, whereas others are not (e.g., S. Cohen & Hoberman, 1983; Henderson et al., 1981). For example, studies of college students have indicated that the perceived availability of material aid (tangible support) does not operate as a buffer, although the perceived availability of persons to talk to about one's problems (appraisal), persons who make one feel better about oneself (self-esteem), and others with whom to do

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things (belonging) are generally effective buffers (L. H. Cohen, McGowan, Fooskas, & Rose, 1984; S. Cohen & Hoberman, 1983; S. Cohen, Mermelstein, Kamarck, & Hoberman, 1985; Graham & Gottlieb, 1983). Hence we separately examine the role of social skills in the stress-protective effects of each of these functions.

Does social support protect only people with particular social skills? If greater social skill results in being more able to mobilize available supporters or use support more effectively, then support-buffering effects would be expected to occur primarily for those with greater skill (cf. Lefcourt, Martin, & Saleh, 1984; Monroe & Steiner, 1986). For example, it is likely that persons with greater social skills would be more able to communicate the need for aid without directly asking for it, to ask for it in a way that is nonoffensive to a potential donor, or to effectively use a resource such as the availability of a confidant. Our second goal, then, is to determine whether the buffering effectiveness of perceived availability of support differs for persons who differ in social competence, social anxiety, or self-disclosure.

Do people with different social skills differ in their ability to develop support networks and support perceptions? In addition to their possible role in the stress-buffering process, social skills have been viewed as playing a role in the development of social networks, perceptions of support availability, and in the maintenance and mobilization of support (see Gottlieb, 1983; Hansson et al., 1984; Heller & Swindle, 1983; Monroe & Steiner, 1986; Shaver, Furman, & Buhrmester, 1985). Social competence, social anxiety, and self-disclosure may be especially important characteristics because they may represent an individual's ability to attract, maintain, and mobilize support from others. They may also influence people's perceptions of available support. For example, a socially anxious person might perceive less support to be available than is actually the case; a socially competent person might perceive more support to be available than is actually the case. Our third purpose is to address the role of stable differences in social skills in the development of both friendships and perceptions of availability of social support resources. We focus on perceptions of support resources because it is perceived availability of support that has been found to buffer stress-induced pathology (see reviews by S. Cohen & Wills, 1985; Kessler & McLeod, 1985). Friendship formation is studied in order to provide some comparison between the development of perceived social support and the development of social relationships. Moreover, by assessing friendship development, we are able to determine whether the influence of stable social skills on perceived support is mediated by changes in number of friends or merely by changes in the perception of the support available from one's social network.

To address the issues just raised, we present both cross-sectional and prospective-longitudinal data from a sample of incoming college freshmen who were followed over a school year. Because many students enter college without knowing other students or other persons in the community, this sample has a reasonable distribution of social support (many samples are very negatively skewed). It also provides an excellent opportunity to examine the development of friendships and support perceptions over the school year as a function of these social skill measures.

In sum, we (a) examine the possibility that social competence, social anxiety, and self-disclosure are primarily responsible for the apparent stress-protective effect of social support; (b) determine whether these social skill measures discriminate among persons for whom support will help, hinder, or be ineffective in the face of stress; and (c) determine how stable social skills influence the development and maintenance of support perceptions and of friendships.

Method

Subjects

The subjects were 609 freshmen college students at Carnegie-Mellon University who agreed to complete a 1½-h questionnaire during freshman orientation (one week before the beginning of classes). Of these, 69.6% were male and 30.4% were female. The age range in the sample was 15–27 with a mean age of 18.71. Of the 609 freshmen attending the orientation meeting, 483 completed the entire set of scales, including two social skill scales (self-disclosure and social anxiety). (The majority of the 126 incomplete questionnaires were attributable to error in administration rather than to self-selection.) Of this group, 66.5% were male, and 33.5% were female; the age range was 15–27 with a mean age of 18.72. Hence the smaller sample very closely approximates the entire 609. The 483 who completed the social skills measures are the sample considered in this study.

Longitudinal sample. A random sample of 188 (of the original 609) was drawn for participation in two additional testing sessions conducted at 11-week intervals. The follow-up sessions occurred near the end of the fall semester (Panel 2), and at the beginning of the winter semester (Panel 3). Each of the 188 persons received a written invitation and follow-up phone call for each follow-up panel. Those participating in the second panel received a lottery ticket that gave them one chance in five to win $25. For the third panel, participants received $5 in addition to a chance to win a cash prize. We determined the size of the prize by putting $1 in the pool for each person reporting to that session.

Because the measure of social competence was collected during Panel 2 but not during Panel 1, cross-sectional analyses of Panel 1 data in which we used this measure include only the data of persons who participated at Times 1 and 2. Last, the longitudinal–prospective analyses include a set enabling us to predict from Panel 1 to Panel 2 and a set enabling us to predict from Panel 2 to Panel 3. Hence data reported in this article derive from three separate breakdowns of the total sample: all persons who participated and completed all questionnaires in Panel 1 (N = 483); those who participated in Panels 1 and 2 (N = 130 of a possible 188, or 69.1%); and those who participated in Panels 2 and 3 (N = 93 of 188, or 49.5%).

Assessing possible attribution biases. Because not all subjects in the longitudinal sample participated in all panels of the study, it is important to determine whether selective participation (attrition) is related to the predictor or criterion variables (Berk, 1983; S. Cohen, Evans, Stokols, & Krantz, 1986, Chap. 2). Separate analyses of variance were done for each of the two longitudinal sample breakdowns (1–2, 2–3); presence versus absence at both of the relevant panels was the independent variable, and all the variables used in the longitudinal analyses—five social support measures, number of friends, and the three social skill measures (social competence analysis based on Panel 2 data for 2–3 sample only)—were dependent variables. In separate F tests we compared variances of those present and absent at each testing session on each of the compared variables. In short, in these analyses we examine (a) whether those people who attended a particular testing session had different (Panel 1) scores on criterion variables than those who did not attend and (b) whether there were differences between participants and nonparticipants in variances of study variables that could differentially influence power for one sample in comparison with another. A $p < .10$ criterion was used to provide a conservative criterion of sample selection bias.

None of the 17 analyses indicated differences between mean scores of the participants and nonparticipants. One of the 17 analyses of potential

differences in variance was significant; self-disclosure scores for participants in Panels 1 and 2 had greater variance than for those not participating in both of these panels. Because increased variance would not result in a decrease in power, this difference was deemed unimportant. In sum, it seems safe to conclude that there were no relevant attribution biases in terms of representativeness of either sample nor any biases restricting variability.

Instruments

Social support. A measure of social support, the college student form of the Interpersonal Support Evaluation List (ISEL; S. Cohen & Hoberman, 1983; S. Cohen et al., 1985) was administered in each of the three panels. The ISEL consists of 48 statements concerning the perceived availability of potential social resources. The items are counterbalanced for social desirability. Respondents are asked to indicate whether each statement is "probably true" or "probably false" about themselves. The items that constitute the ISEL fall into four 12-item subscales designed to assess the perceived availability of four separate functions of social support. A "tangible" subscale includes items designed to measure the perceived availability of material aid from others. An "appraisal" subscale measures the perceived availability of someone to talk to about one's problems. A "self-esteem" subscale measures the perceived availability of a positive comparison when evaluating one's self in relation to others, and a "belonging" subscale measures the perceived availability of people with whom one can do things. Prior work has demonstrated that the ISEL is a reliable and valid measure of social support and that its subscales are reasonably independent from one another (see S. Cohen et al., 1985). The alpha coefficients for the ISEL in this sample were .90 for the entire scale, .65 for tangible, .71 for belonging, .89 for appraisal, and .61 for self-esteem.

Number of friends. In the first, second, and third panels, subjects answered questions about their friendships. In the first panel, they indicated on a scale ranging from 0 to 4 or more the number of close friends they had. In the second and third panel they were asked how many male and how many female friends "who are currently important to you" they had; they answered on the same scale ranging from 0 to 4 or more. In order to equate the number-of-friends questions used in Panels 2 and 3 with the question used in Panel 1, the number of male friends and female friends were summed, which resulted in a number of friends measure for the latter panels. Because the Panel 1 measure was truncated at 4, whereas the Panels 2 and 3 measure allowed a maximum of 8, the variance for the Panel 1 measure is slightly attenuated in relation to the other panels (standard deviations of 1.11, 1.75, and 1.62 respectively). Hence it is possible that the measurement procedure resulted in slight attenuation of actual associations through the use of the Panel 1 measure.[1]

Perceived stress. A global measure of perceived stress, the Perceived Stress Scale (PSS; S. Cohen, in press; S. Cohen, Kamarck, & Mermelstein, 1983) was also administered in each of the three panels. The PSS is a 14-item self-report measure designed to tap the degree to which situations in one's life are appraised as stressful. The items are counterbalanced for desirability. Half of the statements indicate low stress; the remaining half indicate high stress. Subjects respond to each statement by indicating how often (on 5-point scale ranging from *never* to *very often*) they have felt or thought in the way indicated by the statement during the previous month. The PSS includes items designed to tap the degree to which respondents find their lives to be unpredictable, uncontrollable, and overloaded, and it includes a number of direct queries about current levels of experienced stress. Prior work demonstrates that the PSS has adequate internal and test–retest reliability and both concurrent and predictive validity (see S. Cohen et al., 1983). The alpha coefficient for the PSS in this sample was .85.

Depression. The Center for Epidemiologic Studies Depression Scale (CES-D) was administered in each of the three panels. The CES-D is a 20-item scale designed to measure current level of depressive symptomatology, especially depressive affect (Radloff, 1977). Subjects respond to each item by indicating the degree to which they have felt in the way described during the previous week on 4-point scales ranging from 0 (*rarely or none of the time*) to 3 (*most or all of the time*). Prior work has found the CES-D to have both adequate test–retest reliability and internal consistency (Radloff, 1977). The alpha coefficient for the CES-D in this sample was .79.

Social anxiety. A measure of social anxiety (Fenigstein, Scheier, & Buss, 1975; Scheier & Carver, 1985) was administered in each of the three panels. The social anxiety scale includes six items tapping feelings of discomfort in social settings. Subjects read each item and indicated on a 5-point scale how characteristic the statement was of them from 0 (*extremely uncharacteristic*) to 4 (*extremely characteristic*). This scale was originally developed as a subscale of the Self-Consciousness Scale (Fenigstein et al., 1975). The alpha coefficient for the social anxiety scale in our sample was .66. Additional psychometric data including support for construct validity are reported in the Fenigstein et al. article.

Social competence. A measure of social competence based on a scale developed by Levenson and Gottman (1978) was administered during the second and third panels. Included in this measure were nine of the original 18 Levenson and Gottman items and four additional items. The Levenson and Gottman items were from the half of their instrument in which subjects were asked to rate the extent to which a behavior is indicative of them on a scale from 0 (*I never do this*) to 4 (*I always do this*). Each item listed a behavior representing either assertiveness skills (4 items) or dating skills (5 items). The four additional items were descriptions of behaviors that are representative of social skills with same-sex others, and were in the same format.[2] A principal components factor analysis (with iterations) of the 13-item revised scale yielded four factors, the first of which explained 56.7% of the variance and could be labeled a *general social competence* factor. Loadings for the 13 items on this factor ranged from .28 to .78. Each of the items that we added to this scale had a loading above .42. Levenson and Gottman (1978) reported evidence for the reliability and validity of their scale. In addition, a reliability analysis of the revised scale yielded a Cronbach's alpha of .82. Test–retest correlations across panels in our study ranged from .62 to .76.

Self-disclosure. During the first panel only, a measure of self-disclosure was administered (Jourard, 1971, Appendix 12). This scale consisted of 21 self-disclosure items that 30 male and 30 female college students had rated for intimacy on a scale from 0 (*low intimacy*) to 5 (*high intimacy*). The scale included seven low-intimacy items (e.g., "What are your preferences and dislikes in music?"), seven medium-intimacy items (e.g., "What were the occasions in your life in which you were the happiest?"), and seven high-intimacy items (e.g., "What are your guiltiest secrets?"). Subjects rated each topic, in terms of how much information they had disclosed about the topic to other persons at any point in their life, on a scale from 1 (*almost nothing*) to 5 (*complete disclosure*). Each subject did this twice: once for disclosures to females and once for disclosures to males (male and female scores correlated .67). The self-disclosure

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[1] The stability of cross-sectional replications of correlations between number of friends and other study variables suggests that no significant attenuation of associations occurs. For example, correlations with social anxiety (only social skill available across all three panels) are −.17, −.23, and −.16, respectively, and correlations with depressive symptoms are −.24, −.23, and −.28, respectively.

[2] The four new items were as follows: (a) "Maintain a long conversation with a member of the same sex"; (b) "Drop by or arrange to spend time with a new acquaintance of the same sex"; (c) "Be able to accurately sense how a member of the same sex feels about you"; (d) "Have an intimate emotional relationship with a member of the same sex." In addition, the original scale item "Have an intimate physical relationship with a member of the opposite sex" was changed to read "Have an intimate physical relationship with another person."

score used in our analyses is a sum of the male and female scores. The alpha coefficient in this sample for the self-disclosure scale was .96.

Results

Can the Stress-Protective Effect of Social Support Be Explained by Social Skill Proxies?

Before we examined the ability of social skill factors to explain social support-buffering effects, it was necessary to establish the influence of support on symptomatology in our sample. Hence the stress-buffering analysis is presented first without social skill controls and then with the controls added.

Buffering effects. The first set of analyses was designed to assess whether there were Stress × Support interactions in the Panel 1 data that were consistent with the support-buffering hypothesis. The expected buffering interaction would indicate that social support was more effective in reducing depressive symptoms for people under high stress than for people under low stress. A separate regression analysis that was predictive of depressive symptoms was run for each of the five support measures (ISEL, four ISEL subscales). In each analysis, perceived stress and the respective measure of support were entered into the equation first, followed by the interaction term (i.e., the product of stress and support).

Buffering interactions were found for depressive symptoms for the overall ISEL scale, $F(1, 476) = 8.69$, $p < .01$ (0.87% variance accounted for), and for the belonging, $F(1, 478) = 11.61$, $p < .01$ (1.16% variance), self-esteem, $F(1, 471) = 4.40$, $p < .01$ (0.47% variance), and appraisal subscales, $F(1, 475) = 7.19$, $p < .01$ (0.75% variance). There was no Stress × Support interaction in the case of the tangible support scale. It is noteworthy that results from the entire sample of 609 are totally consistent with those from the smaller (483) sample, which included only those who completed the social skill scales. The form of these interactions are depicted in Figure 1. Although the figure is based on median splits of perceived stress and the social support subscales, the analyses were based on continuous data. As is apparent from the figure, all three significant interactions are consistent with the hypothesis that social support partly protects persons from the pathogenic effects of stress.

Controlling for social skills. In order to determine whether these interactions could be explained in terms of social anxiety, social competence, or self-disclosure, these analyses were run again with additional "control" variables entered into the equation. Control variables included Panel 1 social anxiety and self-disclosure, Panel 2 social competence, and the interactions (products) of each of these social skill factors and Panel 1 perceived stress. The three social skill factors were forced into the equation first, followed by perceived stress, the social support factor, the interactions between stress and each of the social skill factors, and lastly the Stress × Support interaction (product). Because only those persons who participated in Panel 2 had scores on social competence ($N = 132$), we ran the analysis a second time, excluding social competence (i.e., controlling only for Panel 1 social anxiety and self-disclosure) and the interactions of these factors with Panel 1 perceived stress ($N = 483$).

In the analysis in which we controlled for the possible roles of self-disclosure and social anxiety, Stress × Support interactions were found for all the same support measures as in the original analysis except for self-esteem. F values and increments to R^2 were as follows: for the ISEL, $F(1, 471) = 4.35$, $p < .01$ (0.4% variance accounted for), for belonging, $F(1, 470) = 9.02$, $p < .01$ (0.87% variance), and for appraisal, $F(1, 470) = 5.81$, $p < .01$ (0.58% variance). There was no Stress × Support interaction for tangible support or for self-esteem support, although the latter did account for 0.24% of the variance.

The analyses including self-disclosure, social anxiety, *and* social competence controls included only persons who completed the social competence questionnaire and hence constituted a much smaller sample than those discussed earlier. Hence before conducting the analysis controlling for social skills, we redid the buffering analyses without controls in order to assess whether the interaction was found in this smaller sample. Analyses indicated a significant Stress × Support interaction only in the case of the belonging scale, $F(1, 104) = 6.28$, $p < .05$ (2.68% increment in variance). Marginal effects were found for the entire ISEL scale, $F(1, 103) = 2.76$, $p < .10$ (1.20% increment) and for the appraisal scale, $F(1, 102) = 2.75$, $p < .10$ (1.26% increment). When the controls were added to the analyses, a Stress × Support interaction was found only for the belonging subscale, $F(1, 98) = 4.13$, $p < .05$ (1.64% increment), although a marginal interaction was also found in the case of appraisal, $F(1, 97) = 3.28$, $p < .10$ (1.32% increment). A nonsignificant increment of .92% of variance was found in the case of the ISEL. In short, the addition of the controls for the three social skill factors and their interactions with stress had little influence on the interaction that was found to be significant in the original analyses.

Social skills as stress-buffers. Last, we calculated a set of three regression equations to determine whether social competence, social anxiety, and self-disclosure acted as buffers. In each regression, stress was entered first, followed by a social skill factor, and lastly by the Stress × Social Skill interaction (product). Only the Stress × Social Anxiety interaction was significant, $F(1, 478) = 5.44$, $p < .01$ (0.57% increment in variance). As is apparent from Table 1, the interaction supports the buffering hypothesis, although the difference between high and low support under high stress (3.37) is only slightly larger than the difference under low stress (2.88).

In sum, buffering effects such as those reported in previous studies were found for the perceived availability of support scale and for each of the subscales that represented psychological forms of support, but not for the tangible support subscale. With the exception of self-esteem (a very small effect before social skills were partialed out), these interactions were again obtained when a conservative analysis was conducted in order to control for the possible role of social anxiety and self-disclosure in these effects. Last, similar results were found in an analysis in which we simultaneously controlled for social competence, self-disclosure, and social anxiety, although the loss of power because of decreased sample size in these analyses allowed a clear test only in the case of belonging support. When the social skill factors were separately examined as possible buffers, only social anxiety fit the predicted pattern.

The magnitude of the interaction effects were small (explaining between 0.47% and 1.16% of the variance) in the analyses of the entire sample (480) without social skill controls and was only slightly decreased (ranging from 0.24% to 0.87% of the variance)

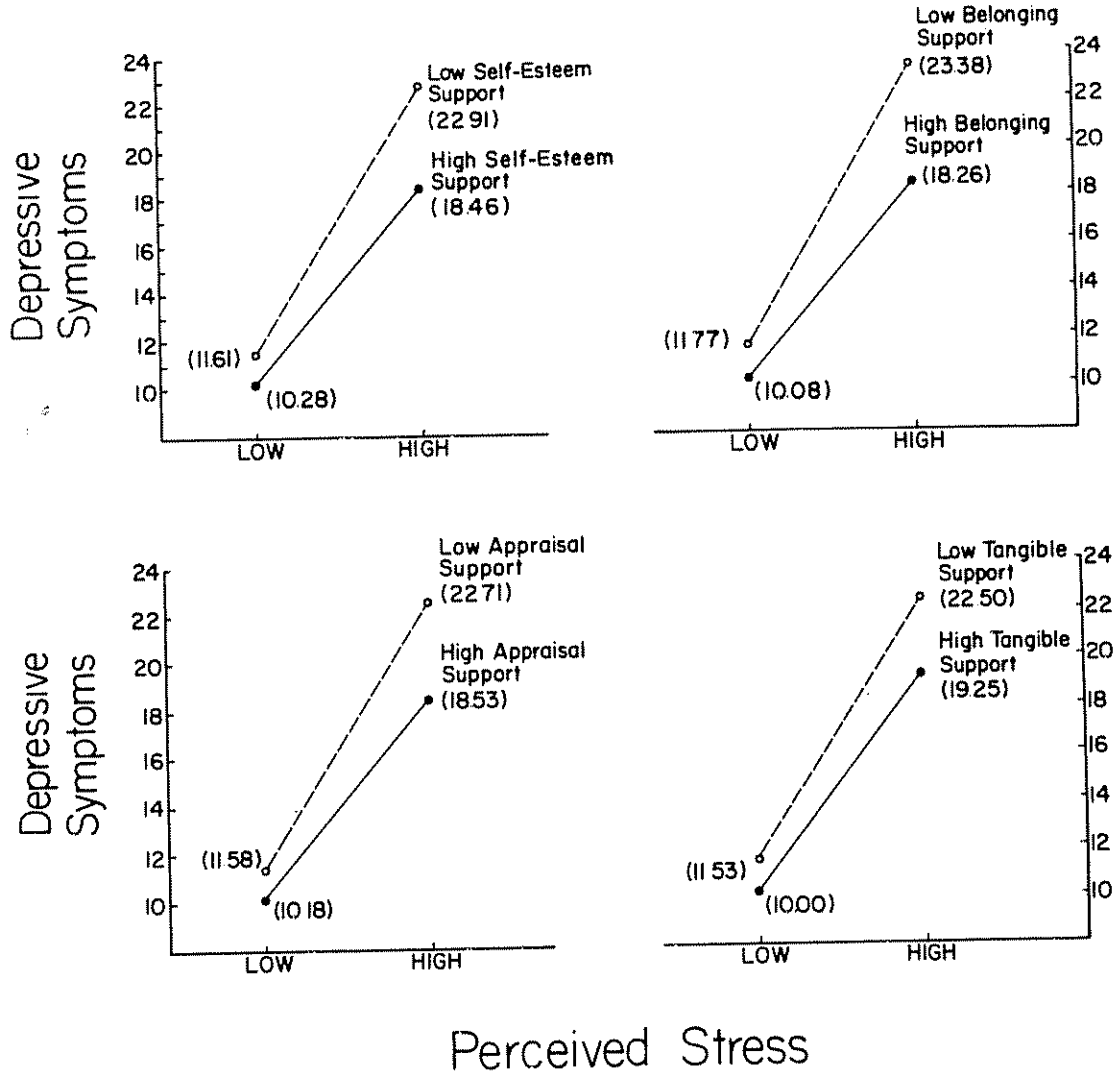


Figure 1 Depiction of the interactions between perceived stress and each social support subscale in the prediction of depressive symptomatology.

in those analyses with controls for social anxiety and self-disclosure. In the smaller sample (132) used for the analysis including all three social skill controls, the original range was 1.20% to 2.68%; with social skill controls, the analysis resulted in a range of 0.92%–1.64%. The small increment in variance accounted for by these buffering effects is consistent with what has been found in previous literature (see discussion by Kessler & McLeod, 1985) and may underestimate the role of this interaction because the variance in this monotone interaction is shared between main effects of stress and support and the interaction term (S. Cohen & Wills, 1985; Reis, 1984). (In all of the analyses, roughly 50% of the variance was accounted for by main effects for perceived stress and social support, which resulted in total R^2s of .50 to .52). In sum, two aspects of the data suggest that the support buffering effects are mostly independent of social skill effects: (a) the consistent significance of the social support buffering effects even when the social skill controls were added and (b) the lack of substantial change in the proportion of variance accounted for by the buffering interactions when social skill controls were added.

Table 1
Mean Depressive Symptom Scores for Persons Above and Below the Median on Perceived Stress and on Social Anxiety

	Social anxiety	
Perceived stress	Low	High
Low	9.61	12.50
High	19.06	22.43

Although the design of the study allows for prospective analysis (e.g., predicting changes in depressive symptoms from perceived stress and social support measures at Panel 1), we deemed such analysis inappropriate in this study for two reasons. First, in such prospective analyses one assumes that both the stress and social support measures are relatively stable over the period of prediction (S. Cohen & Syme, 1985; S. Cohen & Wills, 1985).

For example, if depression tracked stress levels, and stress levels fluctuated significantly over the prediction period, there would be no reason to expect a relation between initial (Panel 1) stress level and depression level at the end of the prediction period. Stability of these measures is a problem in studies of persons being socialized into a new environment, like freshmen college students. In fact, test–retest correlations between the ISEL subscales at Panels 1 and 2 and Panels 1 and 3 suggest that support was not stable over this period: .43 and .35 for appraisal, .48 and .44 for belonging, .60 and .45 for tangible, and .69 and .61 for self-esteem. Moreover, test–retest for the Perceived Stress Scale showed similar instability (correlation between Panels 1 and 2 was .56, and between 1 and 3 was .52). Second, the smaller sample sizes in the longitudinal data set severely reduced the chance of finding buffering interactions (S. Cohen & Wills, 1985; Reis, 1984). In fact, a power analysis (formula from J. Cohen, 1977) based on the contributions of variance in the analysis of the entire sample of 480 in which the interaction between stress and support contributed the most (belonging, 1.16%) indicated that in order to obtain an 80% chance of detecting a stress by support interaction of the anticipated size with a .05 alpha level, we would require 465 subjects. Even in this analysis one would probably underestimate the required sample size because the percentage of variance accounted for by the lag prediction of the interaction is almost certainly substantially smaller than the cross-sectional prediction.

Do Social Skills Moderate Stress × Support-Buffering Effects?

Our second goal was to determine whether Stress × Support buffering effects occurred for persons with higher (or lower) levels of social skills. As we noted earlier, this could occur if social skill characteristics result in some persons' having a greater need for support than others or if social skills render some persons more able to effectively use support than others. We tested this possibility in the Panel 1 data by adding to the social skill control regression equations described earlier, all possible two-way Stress × Social Skill and Support × Social Skill interactions, and finally the three-way Stress × Support × Social Skill interaction. None of the three-way interactions were significant. In a second, somewhat less conservative analytic approach, we calculated separate sets of regressions for each of the three social skill variables. In each, the social skill variable was entered first, followed by perceived stress, social support, the Stress × Support interaction, the Stress × Social Skill interaction, and finally by the Stress × Support × Social Skill interaction. Again, none of the three-way interactions were significant. Hence we found no evidence that self-disclosure, social competence, or social anxiety moderate the buffering effect found in this study.

Are Social Skills Predictive of Changes in Social Support?

Our third goal was to determine whether stable individual differences in social skills (social anxiety, self-disclosure, and social competence) could enable one to predict changes in social support for a sample in which new interpersonal relationships are developing. To determine the importance of these factors at different points of socialization into the college population, we separately examined social skill measures as predictors of changes in support and friendship from Panel 1 to Panel 2 and from Panel 2 to Panel 3. In short, we examined which social skill variables are predictive of changes in support and friendship over the first $2\frac{1}{2}$ months of the freshman year, and then separately for the second $2\frac{1}{2}$ months. Because social competence was not measured during Panel 1, only social anxiety and self-disclosure were used in predicting changes occurring from Panel 1 to Panel 2.

In these regressions, there were six separate criterion variables: ISEL, the four ISEL subscales, and number of friends. The first set of regressions was predictive of Panel 2 criteria. In each equation, the Panel 1 score on the criterion was entered first; then Panel 1 social anxiety or Panel 1 self-disclosure was entered. In Table 2 we report the social skill factors that made significant independent contributions to the prediction of criterion variance after we controlled for the contribution of the criterion as measured in the previous panel. A second set of equations was predictive of Panel 3 criteria. These were identical to the previously described model except that the Panel 2 score on the criterion was entered into the equation first (instead of Panel 1), followed by the Panel 2 score for social anxiety, social competence, or self-disclosure (actually self-disclosure is from Panel 1 in all cases). In Tables 2 and 3 (left side), we report the percentage of variance accounted for by each social skill factor in these analyses. Because of the large number of analyses presented in Tables 2 and 3, we consider these exploratory analyses. For the purpose of interpretation, we treat those with a $p < .025$ as significant and those with $p < .05$ as suggestive. Self-disclosure was the most consistent predictor of change, predicting changes in tangible and appraisal support and number of friends between Panels 1 and 2, and changes in belonging and number of friends between Panels 2 and 3. Social anxiety was predictive of appraisal support in the first lag and tangible support in the second. Social competence (only used in the second lag) was predictive of tangible support.

Do social skills change perceived support levels through changes in number of friendships? It is possible that the social-skill-related changes in perceived support discussed earlier occur because persons with a certain social skill form more friendships and therefore have more available supporters. On the other hand, support changes could reflect cognitive or perceptual biases on viewing one's support network (e.g., Stokes, 1985) or changes in the nature of existing relationships.

In order to determine whether the associations reported in Tables 2 and 3 were mediated by changes in number of friends, additional regression equations were calculated for each of the relations between social skill and support reported in the tables. For those equations predicting from Panel 1 to Panel 2; the Panel 1 score on the support scale under consideration was entered first, followed by the Panel 1 score for number of friends, the Panel 2 score for number of friends, and finally the Panel 1 social skill score. A similar model was used to examine Panel 2 and 3 data; variables from the appropriate panels were substituted for those from Panels 1 and 2. The issue is whether the social skill score accounts for a significant increment in variance over and above the contribution of the change in number of friends.

As apparent from Table 2 (right side), all three analyses of changes between Panels 1 and 2 in which social skills accounted

Table 2
Percentage of Variance Accounted for Predicting Panels 1–2 Changes in Social Support From Social Skill Measures

Type of support	Measure		Partialing out change in number of friends	
	Social anxiety	Self-disclosure	Social anxiety	Self-disclosure
Total social support	1.3	1.3	1.9	0.6
Belonging	0.6	0.7	1.7	0.0
Tangible	1.4	3.6**	0.7	2.8*
Appraisal	3.7**	6.7**	3.4*	4.9**
Self-esteem	0.3	0.0	0.1	0.0
Number of friends	0.4	4.2**	—	—

Note Degrees of freedom for these analyses range from 1, 90 to 1, 25.
* $p < .05$. ** $p < .025$.

for a significant contribution to variance were only slightly decreased in this analysis and remained significant (at least at $p < .05$) even after number of friends was partialed out. As apparent from Table 3 (right side), although there were only moderate decreases in the amount of variance accounted for after change in number of friends was partialed out (decreases ranged from 0.9% to 2.1% of variance accounted for), none remained significant for the analyses in which we examined changes from Panel 2 to Panel 3.

Cross-sectional analyses of relations between social skills and social support. In Table 4 we present the cross-sectional correlations between each social skill measure and each social support measure in each of the three panels (social anxiety in all three panels, social competence in Panels 2 and 3, and self-disclosure in Panel 1). (In order to make these analyses comparable with the prospective ones, only members of the randomly selected subsample were included). All but one of these 30 correlations were significant. They ranged (absolute values) from .14 to .49. In all cases, increases in social skills were associated with increases in the perceived availability of support. In light of the results of the prospective analyses, these associations are at least partly attributable to availability of support influencing perceptions of social skills. In Table 4 we also present these 30 correlations, partialing out number of friends as measured in the same panel. They ranged (absolute values) from .04 to .46. In general, number of friends had only a small to moderate effect on the magnitude of the correlations (27 of the 29 remained significant).

Discussion

Evidence for Stress Buffering

Before examining the possible role of social skill proxies in the stress-buffering effect, we first established that the effect existed. Buffering effects were found for appraisal, self-esteem, and belonging support but not for tangible support. These results are consistent with previous data. In earlier work with the ISEL in the prediction of depressive symptoms in college students, researchers have found buffering for all but the tangible subscales (L. Cohen et al., 1984; S. Cohen & Hoberman, 1983; S. Cohen et al., 1985; Graham & Gottlieb, 1983). The poor performance of tangible support in this regard may be attributable to the kinds of stressors that college students experience (not requiring tangible aid) or to the fact that the other three types of social support are more generally useful in the face of stressful events (cf. S. Cohen & Wills, 1985).

One should be cautious in inferring cause from these buffering analyses because they are cross-sectional and could reflect an influence of depressed affect on perceptions of stress and available support. However, an interpretation of depressive symptoms as the causal agent in this case would require the assumption that symptoms of depression influence perceptions of appraisal, self-esteem, and belonging support, but not of tangible aid.

Can the Buffering Effect of Social Support Be Explained by Social Skill Proxies?

Although it is popularly thought that the buffering effectiveness of perceived social support may be attributable to stable individual differences in social skills (e.g., Gottlieb, 1985; Heller, 1979), our data suggest that this is not the case. Buffering effects of support occur even after one controls for the possible effects of social anxiety, social competence, and self-disclosure. The analyses used in establishing this independence are quite conservative (in some cases five main effects and four interactions

Table 3
Percentage of Variance Accounted for in Predicting Panels 2–3 Changes in Social Support From Social Skill Measures

Type of support	Measure			Partialing out change in number of friends		
	Social anxiety	Self-disclosure	Social competence	Social anxiety	Self-disclosure	Social competence
Total social support	0.1	1.2	0.2	0.4	0.3	0.0
Belonging	0.1	3.2*	1.5	0.2	1.1	0.8
Tangible	2.5*	1.6	3.0*	1.6	0.3	1.6
Appraisal	0.2	2.2	0.0	0.3	0.5	0.4
Self-esteem	0.0	0.0	0.0	0.0	0.4	0.0
Number of friends	0.1	7.2*	0.9	—	—	—

Note Degrees of freedom for these analyses range from 1, 75 to 1, 89.
* $p < .025$.

Table 4
Cross-Sectional Correlations Between Social Skill Measures and Social Support Scales at Each Panel and Equivalent Correlations With Number of Friends Partialed Out

Social support scale	Social anxiety		Self-disclosure		Social competence	
	r	No. of friends partialed out	*r*	No. of friends partialed out	*r*	No. of friends partialed out
Appraisal						
Panel 1	−.25**	−.17*	.35**	.29**		
Panel 2	−.21**	−.18*			.35**	.21**
Panel 3	−.15	−.10			.36**	.25**
Belongingness						
Panel 1	−.37**	−.33**	.24**	.15*		
Panel 2	−.37**	−.30**			.48**	.28**
Panel 3	−.22**	−.18*			.42**	.33**
Self-esteem						
Panel 1	−.49**	−.46**	.14*	.04		
Panel 2	−.48**	−.44**			.29**	.16*
Panel 3	−.41**	−.39**			.36**	.30**
Tangible						
Panel 1	−.23**	−.14*	.19**	.13		
Panel 2	−.24**	−.16*			.39**	.29**
Panel 3	−.31**	−.29**			.36**	.30**
Total ISEL						
Panel 1	−.40**	−.34**	.19**	.13		
Panel 2	−.41**	−.36**			.49**	.31**
Panel 3	−.36**	−.33**			.49**	.41**

Note. ISEL = Interpersonal Support Evaluation List. Sample sizes vary slightly because of missing data. Minimum sample sizes were 141 in Panel 1, 128 in Panel 2, and 109 in Panel 3.
* $p < .05$. ** $p < .01$.

are entered into the equation before the Stress × Support interaction).

Surprisingly, when the social skill measures were individually examined as possible stress buffers, only the lack of social anxiety showed evidence of buffering. The lack of a significant effect of Stress × Social Competence may be attributable to a rather small sample for testing an interaction that is difficult to obtain (recall that the social competence data used in these analyses were measured in Panel 2). However, the lack of an effect for self-disclosure is puzzling. The data showing that self-disclosure is a more important predictor of friendship formation and perceived availability of support than social anxiety suggest that self-disclosure is more likely than social anxiety to operate as a stress-buffer. Perhaps having low social anxiety produced a buffering effect and self-disclosure did not because our buffering analysis was done on data collected at the time when students first arrived on campus. In this context, socially anxious persons may expect that they will not be able to solicit much support, whereas the nonanxious may expect to be successful at this task. On the other hand, persons who have self-disclosed before may feel that their willingness to disclose is helpful only after they develop close relationships that allow disclosure. Because none had been developed at the point of testing, they may not have expected that their willingness to disclose would help them in the face of stress.

It is possible, of course, that social support operates as a proxy for some other stable individual differences not measured in the present study. Some possibilities such as shyness, introversion, and low assertiveness seem to overlap considerably with the social skill measures used in our study. Hence it seems unlikely that they serve as such proxies. However, there are other categories of individual differences that could plausibly account for the effect such as emotional conflict and distress (e.g., anxiety, neurosis, and so on), poor self-regard (e.g., low self-esteem and social concept), or negativistic attitudes (e.g., hostility, or pessimistic attitudes toward people, life, and society; Hansson et al., 1984).

Personality factors that have previously been suggested as possible stress-buffers—for example, locus of control (Johnson & Sarason, 1979; Lefcourt, Miller, Ware, & Sherk, 1981), arousal seeking (Johnson & Sarason, 1979), sensation seeking (Smith, Johnson, & Sarason, 1978), private self-consciousness (Mullen & Suls, 1982), and hardiness (Kobasa, 1979)—provide another source of variables that could be responsible for the stress-protective effect of social support. In the only published research on the possible role of any of these factors in stress-buffering, Kobasa (1979) examined "hardiness"—an amalgam of three separate traits: control, commitment, and challenge. Evidence for the independence of the support buffering effect from hardiness has been reported by Kobasa and Puccetti (1983). These investigators found evidence for buffering interactions of Life Events × Perceived Support from supervisors even after they partialed out the Life Events × Hardiness interaction. Although a similar pattern of results was not found for a family support measure, a failure to test for the buffering interaction independent of hardiness (i.e., was there a buffering effect to proxy?) makes

this latter result difficult to interpret in our context. Evidence reported by Ganellen and Blaney (1984) suggesting that social support may be a proxy for hardiness suffers from the same problem. Because their support measure appears to assess satisfaction with past support (a concept found not to result in buffering in other studies), it is likely that there was no stress-buffering effect in the first place (see the discussion of methodological issues in S. Cohen & Wills, 1985). Clearly, additional studies in which the researchers first test for the buffering interaction and then control for the role of various plausible personality proxies are necessary.

Do Social Skills Moderate Buffering Effects?

We found no evidence that support buffering operated differentially as a function of the social skills measured in this study. As noted earlier, it is plausible that these social skills would play an important role in the mobilization of a support network. One could argue, however, that either (a) such a mobilization is not necessary for buffering to occur, or (b) perceptions of available support already take these skills into account (i.e., the perception would not exist if support could not be mobilized). In the first case, if one assumes that the buffering qualities of social support are cognitively mediated—for example, support operates by affecting one's interpretation of the stressor, knowledge of coping strategies, or self concept (S. Cohen & McKay, 1984)—then beliefs about available support would be more important than its actual availability. In short, the belief that support is available may be sufficient to produce a buffering effect that is irrespective of ability to mobilize support. In the second case, if one assumes that support perceptions are based on an appraisal of one's skills and an accounting of previous social transactions, then these perceptions would already take these stable personality factors into account. Hence the addition of these variables to the equation would only be redundant. The ability of these social skills to prospectively predict changes in perceived availability of social support suggests some validity for this second argument.

It is possible that our failure to detect the three-way Stress × Social Support × Social Skills interaction is attributable to insufficient power. In fact, the small proportions of variance accounted for in the two-way interactions are consistent with such an interpretation. It is reasonable, however, to ask whether effects that account for less than 0.25% of the variance (a 0.25% increment would have been significant) are worth discussing.

Are Social Skills Predictive of Changes in Social Support?

Our data indicate that social skills prospectively predict changes in perception of available social support and in friendship formation. In all cases, increases in social skills are related to increased friendships and perceived support. There are three interesting aspects of these data. First, amount of variance accounted for by the social skills is small, ranging from 2.5% to 7.2%. Clearly, they are not overwhelming determinants of this process. Second, self-disclosure is a good overall predictor of both support and friendship development. Apparently, people who are willing to talk about themselves and their feelings are able to attract friends and the resources that such networks provide. Third, to some extent, different factors contribute to the development of different kinds of support at different points in the development of interpersonal relationships.

For both conceptual and statistical reasons, we place greater emphasis on the analyses of the first longitudinal period (Panel 1 to Panel 2) than on the second (Panel 2 to Panel 3). The first period is representative of a period in which persons are adapting to a new social environment. Their social networks are unstable, and rather dramatic changes in structure and perceptions of their networks should take place in this period. Although we know that less change occurs between Panels 2 and 3, we are somewhat uncertain of how to characterize this period in terms of phases of social network development that would generalize to other situations. In terms of predicting change from social skill measures, we know that there is greater variability of support during the first period than during the second (test–retest correlations between support measures at Panels 1 and 2 ranged from .44 to .69, whereas similar correlations for Panels 2 and 3 ranged from .65 to .79). This constriction of variance makes it more difficult to predict change that does occur.

We are not arguing that these data provide a convincing demonstration that specific social skills enter into the support development process at specific points in the development of interpersonal networks. Instead, we propose that our data suggest that social skills may have different effects at different points in relationship development or in the development of people's entire networks, or both. Such possible differential effects of personality should be conceptualized more carefully and studied in the context of theoretical prediction.

Our inability to use social competence as a predictor in the Panel 1–2 analyses (because it was not measured until Panel 2) limited our ability to look at the differential prediction of this variable. We think that social competence, which to a great extent reflects assertiveness, may have played a significant role in the prediction of early support development, especially in the case of tangible support.

What mediates the relation between social skills and perceived support? Slightly different patterns of mediation occurred in the period in which students initially entered a new social environment (predictions from Panel 1 to Panel 2) and in the period after relatively stable social networks were established (predictions from Panel 2 to Panel 3). The overall pattern of the predictions suggests that social skills are predictive of changes in perceived availability of social support above and beyond changes that occur in the number of friends during the initial socialization period (see Table 2). If the effects of social skills on support were not primarily mediated by number of friends, how were they mediated? Three alternatives seem plausible: (a) Once relationships have been formed, social skills influence the strength or nature of those relationships in such a way as to produce actual differences in available support; (b) social skills influence perception of whether support is available; and (c) social skills influence behavior in relationships such that some people are more likely to find out about support that is actually available than are others, possibly because they have accessed that support.

As is apparent from Table 3, the evidence in regard to the role of number of friends during a later point in the semester, when

friendships and social support levels were more stable, is less clear. At this point, number of friends may play a greater role than in the earlier stage. However, even here there is enough remaining variance, after we control for number of friends, to suspect that other processes are at work as well.

Overall, the prospective data suggest that number of persons in a support network is probably not the major way in which social skills influences support availability. However, it remains for future researchers to determine whether number of friends is a more important mediator in developed networks and exactly which of the alternative processes is operative when network size is not important.

Last, it is worth addressing the difference in cross-sectional correlations reported in Table 4 and the prospective analyses presented in Tables 2 and 3. The concurrent correlations suggest relatively strong relations between all of the social skill measures and all of the support subscales; in some cases up to 24% of variance is accounted for. The concurrent correlations also suggest relatively little effect of partialing number of friends out of these associations. Why are the cross-sectional relations so much larger than the prospective ones? There are two likely explanations: (a) Existing perceptions of social support may influence perceptions of social skills, and (b) to some degree, the social support and social skill measures may overlap (i.e., assess the same underlying concept). (This overlap is controlled for in the prospective analysis because social support at the point of prediction is partialed out of the relation between skills and later support.) In either case, the difference helps emphasize the importance of appropriate prospective analyses in attempting to interpret such relations.

In sum, we replicated earlier work demonstrating the buffering effectiveness of appraisal, self-esteem, and belonging support for college students. Also, as in past studies, we found no evidence for a buffering effect of tangible support. Our data provide little evidence for the role of social skills in the stress-buffering role of social support, but do provide some evidence for the importance of social skills in the development of support perceptions. Future work in which researchers examine the roles of other social skill factors and environmental and social factors that might influence development of support perceptions is needed and would further clarify what is certainly a complex relation.

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