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Prospective Assessment of Social Network Quality among Depressed Mothers Treated with Brief Psychotherapy: The Social Network Quality (SNQ) Scales

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Abstract

Objective—Social relationships play important roles in emotional health, and are common targets of psychotherapeutic interventions. To better evaluate social relationship structure and function in the context of psychotherapy trials, this study introduces and psychometrically evaluates the Social Network Quality (SNQ) scales, which supplement the Social Network Index (SNI). The original SNI evaluates social network *structure* (i.e., extent of participation in diverse social roles and number of social relationships). The SNQ adds two social network *quality* scales evaluating levels of: (a) positivity/support, and (b) negativity/stress, within and across specific social roles.

Method—Participants included 168 depressed mothers of psychiatrically-ill children participating in a psychotherapy treatment trial utilizing interpersonal therapy (IPT) and brief supportive therapy (BSP). The SNI, SNQ, and measures of social functioning and psychopathology were collected at baseline and at 3-month intervals over a one-year period.

Results—SNQ scores showed meaningful concurrent relationships with measures of social support and interpersonal distress, as well as incremental utility in explaining variance in relationship and mood outcomes above and beyond the SNI. SNQ scores also detected global and relationship-specific changes in social relationship quality following psychotherapy treatment.

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Conclusion—This report demonstrates that SNQ scales reliably assess psychotherapy-induced changes in relationship quality.

Keywords

social network; relationships; social support; social network quality; validation

1. Introduction

Social relationships play critical roles in emotional and physical health outcomes, including morbidity and mortality [1], and often serve as the targets for psychotherapeutic interventions (such as interpersonal psychotherapy [IPT], psychodynamic, or marital therapies). Accurate assessment of relationships—including reliable methods to measure change in relationships in the context of a psychotherapeutic intervention—is critically important to psychotherapy process and outcome research.

Social relationships are multifaceted; therefore, approaches to assess them focus on different components of these complex phenomena. A large body of research has focused on assessing *structural* aspects of social relationships, including aspects of social network integration or **social network diversity** (the number of social roles [e.g., parent, friend, employee] one engages in) and **social network size** (the number of people across roles with whom one has regular contact). Other measures emphasize *qualitative* aspects of social relationships given positive health outcomes associated with viewing close relationships as positive and supportive [2], as well as negative health outcomes associated with perceiving social relationships as stressful or demanding [3]. Both structural and qualitative aspects of social relationships are associated with mental health. For example, smaller and less diverse social networks, lower social support, and marital conflict are all related to depression and/or general poor mental health [4-7]. Explanations for these associations include social support's role in buffering the effects of stress [8] and good quality relationships helping to fulfill fundamental psychological needs [7], such as relatedness, autonomy, and competence [9]. In addition, social network size and diversity are associated with amygdala size and amygdala functional connectivity at rest within networks that include the ventromedial prefrontal cortex (vmPFC) and temporal poles [10, 11]. These associations are notable considering that smaller amygdala volume is related to depression in women [12] and that decreased resting-state functional connectivity of a network that includes some similar regions (e.g., amygdala, vmPFC, temporal poles) has been found in depression [13].

Many scales are available to assess *global perceptions* of social support (Gottlieb and Bergen provide a review of such measures [14]; e.g., the Interpersonal Support Evaluation List; ISEL) [15] or interpersonal distress (e.g., the Inventory of Interpersonal Problems; IIP) [16]. Although some social support scales differentiate among social roles (e.g., Perceived Social Support from Friends; PSS-Fr; Perceived Social Support from Family; PSS-Fa) [17], social support and interpersonal distress scales typically require respondents to informally integrate perceptions of support or distress experienced across all of their social roles or relationships or probe one single role to the exclusion of all other roles. Such measures do not provide

precise information regarding qualitative features that may differ across various social network roles or relationships.

Social support is measured in a variety of ways, including its perceived availability (e.g., Medical Outcomes Study: Social Support Survey; MOS:SSS) [18], its frequency (e.g., Inventory of Socially Supportive Behaviors; ISSB) [19]; and its type—such as emotional versus instrumental/tangible (e.g., Krause's battery of brief social support measures) [20]). The majority of these global social support measures, however, do not include negative aspects of relationships, which is essential to consider when investigating the overall quality of social relationships. Although some scales assess negative and positive relationship quality within one particular social role (such as the marital relationship) [21], to our knowledge, no measure captures social support or distress experienced across multiple social roles.

Finally, structural and qualitative aspects of relationships are rarely assessed simultaneously, despite the fact that both components likely contribute to social functioning and may be impacted by psychosocial interventions. Integrating both approaches could elucidate the unique and shared contributions that each of these social network aspects have on clinically-relevant outcomes, such as depression and anxiety. In addition, separately examining qualitative features of each social role or relationship within one's current social network may allow for assessment of both generalized and role-specific strengths and difficulties. Such a measure would permit assessment of changes that occur in the quality of one's general and role-specific social network over time in the context of a clinical trial. Finally, little targeted research has sought to evaluate whether extant social network scales can sensitively detect changes in social network structure or quality that may occur with treatment.

The current report describes the development and psychometric testing of the Social Network Quality (SNQ) scales, self-report measures designed to assess social relationship quality across several different types of social roles that can be added to the structural scales of the Social Network Index (SNI) [22]. We tested the utility of the SNQ scales in a sample of depressed mothers of psychiatrically-ill offspring [23], a group for whom both structural and qualitative components of social relationships are likely important determinants of functioning. In terms of criterion validity, we hypothesized that the SNQ scales would show strong concurrent relationships with conceptually proximal measures of social network structure (i.e., SNI) and global measures of perceived social support (ISEL) and interpersonal difficulties (IIP). Based on the assumption that trait-like features of an individual's interpersonal style will influence the quality of social network relationships, we hypothesized that one's adult attachment style [24] would also show concurrent associations with SNQ scales. Finally, given research suggesting that social network quality is related, if indirectly, to outcomes such as depression and anxiety [7], we expected to find significant—but weaker—relationships with these more distally related measures. We also tested the incremental utility of the SNQ qualitative scales to explain levels of outcome variance in both social relationship and mood scales above and beyond the variance explained by the traditional SNI structural scales.

Longitudinal data were then used to evaluate the sensitivity of the SNI and SNQ scales to detect changes in social relationship structure and quality over time. We hypothesized that over a one-year period following treatment initiation, depressed mothers would show increases in social network diversity and social network size, along with increases in perceived support and decreases in perceived relationship stress. Leveraging the characteristics of our sample of depressed mothers, we also explored the SNQ's ability to assess changes in specific social roles. As a secondary hypothesis, we explored whether depressed mothers would show *specific improvements* in their relationships with their children in the year following treatment initiation.

2. Method

2.1 Participants and Procedure

All study procedures were approved by the Institutional Review Board of the University of Pittsburgh. Participants provided informed written consent after receiving a complete study description. A sample of 168 biological or adoptive mothers with a current DSM-IV diagnosis of major depressive disorder and who lived with (and had custody of) at least one 7-18-year old child with an internalizing psychiatric disorder were recruited from child health clinics and advertisements. They completed the SNI, SNQ, and interpersonal functioning and psychopathology measures at baseline. Mean participant age was 44.7 years ($SD = 7.3$; range 26 - 60). Participants self-identified as: 79.2% White, 17.9% Black or African American, 1.8% Asian, and 1.2% other or multiracial; none self-identified as Hispanic or Latino. A third (31.6%) had household incomes $< \$30,000$. Almost half (45.2%) had at least three lifetime major depressive episodes and most (64.3%) had one or more co-occurring anxiety disorders based on the Structured Clinical Interview for DSM-IV-TR (SCID-I) [25]. Participants were randomly assigned to receive brief interpersonal psychotherapy for mothers (IPT-MOMS) [26] or brief supportive therapy (BSP) [27]. IPT is an evidence-based psychotherapy for depression that focuses on understanding the connection between mood and relationships, improving social support, and addressing interpersonal difficulties [28]. IPT-MOMS is based on a brief version of IPT [29] with the addition of (a) an engagement session that incorporates principles of motivational interviewing [30] and ethnographic interviewing [31] to address potential treatment-seeking barriers [32], and (b) specific strategies that target improving problematic interpersonal relationships with psychiatrically-ill children. BSP is grounded in Rogers' Client-Centered Therapy [33] and is a manualized intervention that uses a nondirective approach to facilitate the exploration of affect, emphasize patient strength, engender a therapeutic alliance, and provide empathic support [27]. It has been found to be efficacious in previous randomized clinical trials [34] and controls for nonspecific factors of psychotherapy that may account for 30% to 70% for variance in treatment outcomes [35]. Interventions were administered as nine individual psychotherapy sessions provided to mothers over a 12-week period. Full study details are provided elsewhere [23]. Participants completed follow-up self-report measures 3, 6, 9, and 12 months after baseline assessment.

2.2 Social Network Scales

The Social Network Quality (SNQ) scales supplement the Social Network Index (SNI) [22], which assesses social network diversity and size. The SNI asks respondents to endorse which of 12 types of social relationships (e.g., parents, children, friends, neighbors, coworkers) they regularly (at least once every two weeks) engage with, as well as the number of people with whom they regularly interact in each category (SNI can be found at <http://www.psy.cmu.edu/~scohen/SNI.html>). One point is given for each social role endorsed, providing a measure of **social network diversity** (number of social roles) ranging from 0-12. The total number of people identified in each role (with a maximum of 7 in each) is summed to provide an estimate of **social network size** (number of social contacts), ranging from 0-68. The SNQ adds to the SNI by asking respondents to rate the quality of relationships in each of the 12 social roles. Specifically, respondents are asked, “In the past month, how often has your relationship with (your/these) _____ been positive or supportive?” and, “In the past month, how often has your relationship with (your/these) _____ been negative or stressful?” on a 5-point Likert scale, ranging from 0 = *Not at all* to 4 = *Always or almost always*. Ratings are then averaged across all endorsed social roles. Thus, the SNI and SNQ together provide scores that capture: (1) social network diversity (SNI), (2) social network size (SNI), (3) social network positivity/support (SNQ), and (4) social network negativity/stress (SNQ).

2.3 Criterion Validity Scales

The 12-item *Interpersonal Support Evaluation List* (ISEL) [15] assesses perceived social support, with items rated on a 4-point Likert scale (1 = *Definitely True*; 4 = *Definitely False*). A 15-item version of the *Inventory of Interpersonal Problems* (IIP) [36] assesses problems related to interpersonal sensitivity, interpersonal ambivalence, and aggression. Items are rated on a 5-point Likert scale (0 = *Not at All*; 4 = *Extremely*). The *Experiences in Close Relationships scale* (ECR) [24] assesses adult attachment style with 18-item attachment anxiety and 18-item attachment avoidance scales. Items are rated on a 7-point Likert scale (1 = *Disagree strongly*; 7 = *Agree strongly*). The 17-item *Hamilton Rating Scales for Depression* (HRSD-17) [37] is a semi-structured clinical interview that assesses depressive symptom severity; inter-rater reliability in this study was high (ICC = 0.99). The *Mood and Anxiety Symptoms Questionnaire* (MASQ) [38] anhedonic depression (MASQ-AD scale, 22 items) and anxious arousal (MASQ-AA scale, 17 items) scales assess anhedonia and anxiety-related somatic symptoms, respectively. Items are rated on a 5-point Likert scale (1 = *Not at all*; 5 = *Extremely*).

2.4 Statistical Analyses

To evaluate criterion validity, we ran bivariate Pearson correlations of the SNQ and SNI scales across each of the criterion validity scales obtained at the baseline assessment. To examine the incremental validity, we tested whether the qualitative SNQ scales explained outcomes above and beyond the traditional SNI social network structure scales by running hierarchical multiple regression models that included SNI scales in step one and SNQ scales in step two. Finally, we used multilevel modeling (longitudinal data nested within participants) to test the ability of SNQ and SNI scales to detect changes in relationship

structure and quality over time, as indicated by assessments collected at 3-month intervals over the course of one year. These multilevel models used the MIXED procedure of the SAS 9.3 software. We included time as the predictor variable, added random intercepts and slopes for time, and used unstructured covariance structures. Reported results include parameter estimates with standard errors.

3. Results

3.1 Descriptive Statistics

Table 1 provides baseline SNI and SNQ assessment data for each scale separated by the 12 social roles, as well as by total scale scores. Among the 160 participants who provided baseline SNI and SNQ data, the mean number of SNI social roles was 5.98 (SD = 1.86) and the mean total SNI contacts was 14.34 (SD = 6.77). Not surprisingly (given the sample), children represented the most highly endorsed relationship category (with 98.1% of mothers endorsing some contact with children in the past 2 weeks), followed by close friends, parents, and romantic partners. The highest numbers of contacts were within children (2.71) and work (2.69) categories. On average, mothers reported experiencing relationships as more positive/supportive ($M = 2.75$, $SD = 0.63$) than negative/stressful ($M = 1.34$, $SD = 0.59$; $M_{diff} = 1.41$, $t(159) = -16.73$, $p < .001$, 95% CI [1.24, 1.57], $d = 1.32$), with positive experiences occurring most frequently with close friends, religious groups, and other relatives, and negative experiences occurring most frequently in relationships with children and romantic partners.

3.2 Criterion Validity

Bivariate correlations among the SNI and SNQ scales and the criterion validity measures are provided in Table 2. The SNI scales (number of social roles and contacts) were highly and positively correlated ($r = .72$), and the SNQ scales (positivity/support and negativity/stress) were also highly but negatively correlated ($r = -.51$). Greater numbers of social roles/contacts showed moderate, yet significant, *positive* associations with perceived network positivity and *negative* associations with perceived network negativity. The positivity/support scale was strongly and positively associated with the ISEL, and moderately and negatively associated with the IIP, ECR attachment anxiety, and ECR attachment avoidance. In contrast, the negativity/stress scale displayed an opposite pattern of associations. The SNQ scales also showed a predictable pattern of associations with depression and anxiety measures. We used Preacher and colleagues' method [39] for testing differences between two dependent correlations that have one variable in common. Notably, the positivity/support scale was found to be more strongly associated with the conceptually-proximal interpersonal support (ISEL) scale, as compared with the more conceptually-distal depression and anxiety scales (HRSD-17, $z = 2.76$, $p = .006$; MASQ-AA, $z = 3.39$, $p < .001$).

In contrast, concurrent associations with SNI structural scales displayed a differing pattern of results (Table 2), with number of social roles being more strongly associated with a measure of depression (MASQ-AD) than with two of the interpersonal measures (IIP, $z = 2.20$, $p = .028$; ECR Attachment Anxiety, $z = 2.30$, $p = .021$). Similarly, number of social

contacts was more strongly associated with depressive symptoms (MASQ-AD) than with the interpersonal measure of attachment anxiety (ECR Attachment Anxiety, $z = 2.20$, $p = .028$).

3.3 Incremental Validity

To demonstrate incremental validity, we conducted hierarchical multiple regression models predicting concurrent relationship and mood outcomes, in which we included the SNI scales in step one, followed by the SNQ scales in step two (Table 3). Adding SNQ scales resulted in significant increases in the amount of variance explained (R^2) for nearly all scales with the exception of anxious arousal (MASQ-AA). An examination of standardized beta weights for each of the four SNQ and SNI scales indicate that the SNQ positivity/support scale explained the greatest amount of unique variance across outcomes—with the exception of anxious arousal (MASQ-AA), for which only SNI number of roles explained unique variance. It is worth noting that SNI number of roles also explained unique variance in full models predicting anhedonic depression (MASQ-AD) and attachment avoidance (ECR-Av); whereas SNI number of social contacts was not a unique predictor in any of the full models and the SNQ negativity/stress scale explained unique variance only for attachment anxiety (ECR-Ax).

3.4 Sensitivity to Change

Change in SNQ and SNI scale scores over time are shown in Figures 1 and 2. Time was significantly related to decreases in perceived negativity/stress ($\gamma_{10} = -0.02$, $SE < 0.01$, $t(140) = -5.32$, $p < .001$, 95% CI [-0.03, -0.01]) and increases in perceived positivity/support ($\gamma_{10} = 0.02$, $SE < 0.01$, $t(131) = 4.69$, $p < .001$, 95% CI [0.01, 0.03]). Although the number of social roles seemed to increase over the course of one year, multilevel modeling results indicated that the relation between time and the number of social roles did not reach conventional levels of statistical significance ($\gamma_{10} = 0.02$, $SE = 0.01$, $t(124) = 1.76$, $p = .081$, 95% CI [0.00, 0.04]). There did not appear to be an increase in contacts over time ($\gamma_{10} = 0.04$, $SE = 0.04$, $t(122) = 1.12$, $p = .266$, 95% CI [-0.04, 0.12]). Given that the largest changes in social function were expected between pre-treatment assessment and end of acute treatment (three-month follow-up), we also conducted paired-samples t-tests to evaluate changes during this period. There was a decrease in negativity/stress ($M_{diff} = -0.21$, $t(122) = -4.05$, $p < .001$, 95% CI [-0.31, -0.11], $d = -0.37$) and an increase in positivity/support ($M_{diff} = 0.18$, $t(122) = 3.74$, $p < .001$, 95% CI [0.08, 0.27], $d = 0.34$) and contacts ($M_{diff} = 1.24$, $t(122) = 2.75$, $p = .007$, 95% CI [0.35, 2.13], $d = 0.25$). The increase in social roles ($M_{diff} = 0.25$, $t(122) = 1.90$, $p = .059$, 95% CI [-0.01, 0.51], $d = 0.17$) fell just short of conventional levels of statistical significance. A Treatment $\times$ Time interaction did not significantly predict any of the SNI and SNQ scales. The main treatment outcome study also did not find a significant Treatment $\times$ Time interaction for primary outcomes [23].

Given the parent trial's focus on the intergenerational transmission of depression, we also explored specific changes in mother-child relationship quality over time by evaluating responses to the “children-related” SNQ items (which measures perceived relationship quality with all of one's children). As expected, time was significantly associated with decreases in child-focused negativity/stress ($\gamma_{10} = -.04$, $SE = 0.01$, $t(495) = -6.57$, $p < .001$, 95% CI [-0.05, -0.03]) and increases in child-focused positivity/support ($\gamma_{10} = 0.03$, $SE =$

0.01, $t(499) = 4.45$, $p < .001$, 95% CI [0.02, 0.04]; see Figure 3). These two multilevel models did not include random slopes for time because the estimated G matrix was not positive definite when including a random slope in the negativity/stress model. Paired samples t-tests also showed a significant decrease in child-focused negativity/stress (Mean Difference = -0.41, $t(119) = -5.79$, $p < .001$, 95% CI [-0.55, -0.27], $d = -0.53$) and increase in child-focused positivity/support (Mean Difference = 0.28, $t(119) = 3.77$, $p < .001$, 95% CI [0.13, 0.42], $d = 0.34$) from baseline to the 3-month assessment.

4. Discussion

Adding the SNQ scales to the SNI brings together two complementary approaches for assessing social relationships—social network structure and perceived quality of relationships within each social role—into a single assessment format. Patterns of concurrent correlations between the SNQ scales and such proximally-related interpersonal constructs as social network structure (SNI scales), global perceptions of social support and distress (ISEL and IIP), and adult attachment styles (ECR scales) provide evidence of criterion validity. The SNQ scales also display significant, yet weaker, patterns of relationships with clinician and self-reported measures of mood and anxiety symptoms, constructs theorized to be more distally related to relationship quality within the broader nomological network. Finally, the SNQ scales demonstrate incremental utility by exhibiting increases in explained variance (R^2) in both proximally (interpersonal) and distally (mood and anxiety) related constructs above and beyond the amount of variance that could be explained by the original SNI scales.

The positivity/support and negativity/stress SNQ scales were calculated by averaging the positive and negative ratings for each social role endorsed by the respondent. A disadvantage to this scoring system is the inability to calculate typical measures of internal consistency (Cronbach's alpha), because SNQ scores are based on varying subsets of items depending on the specific social roles endorsed by participants (on average, participants endorsed only 6 of 12 social roles). Alternate scoring systems that focus on specific social roles, or that weight scores based on the hypothesized importance of each role could also be considered. However, the relative importance of social roles likely varies according to cultural and individual differences, undermining the ability to develop a widely applicable yet unbiased weighting system.

An immense benefit of the SNQ lies in its sensitivity to change, which may enhance the investigation of psychosocial functioning changes in response to treatment [40]. The SNQ scales appear to be more sensitive to change than the structural SNI scales, which raises interesting questions about mechanisms of change in response to psychosocial treatments for depression. Adopting the SNQ scales in studies that examine associations between social networks and physical and mental health outcomes may permit a more nuanced understanding of these specific, mechanistic relationships. In the current trial, all participants received psychotherapy, which included either IPT or BSP. Contrary to what one might expect, mothers assigned to both the more directive, interpersonally-focused IPT and the less directive, affect-focused BSP treatment arms displayed similar improvements in relationship function and mood (as indicated by the lack of Treatment $\times$ Time interactions). In future

studies, it would be interesting to examine whether differential changes in SNQ scores are observed across other types of depression treatments, such as in trials of relationship-focused psychotherapy versus pharmacotherapy.

Another benefit of the SNQ is its ability to focus on specific social roles, such as mother-child relationships. This is particularly helpful when a specific relationship is of interest or in trials that target specific social relationships (e.g., marital or family therapy). This study was conducted in high-risk dyads of depressed mothers with psychiatrically-ill children; therefore mother-child relationships were of particular interest. It is noteworthy that unlike most of the other social roles assessed—where the perceived level of positivity/support far outweighed that of negativity/stress—depressed mothers' relationships with their children (at least one of whom was psychiatrically ill) were rated as equally positive and negative at baseline. Positivity/support between mothers and their children increased and negativity/stress decreased over one year, with the largest changes observed in the first three months of active treatment. However, even at the 12-month assessment, levels of reported relationship stress in this domain remained elevated, and the positivity to negativity ratio remained low, relative to other social roles. These findings may point to the need for conjoint treatments for mother-child dyads when both mother and child struggle with depression. In addition, the potent impact of positive social relationships, as indicated by hierarchical multiple regression results, suggests the importance of building positive social activities, interactions, and relationships with children (and other relationships) over time.

A strength of the present study is that it evaluated the SNQ in a unique sample known to have specific constellations of relationship and emotional difficulties. However, testing the SNQ in depressed mothers with psychiatrically-ill children limits generalizability of study findings. Another limitation is that we primarily used self-report questionnaires. Future studies should evaluate the performance of the SNQ in larger, more generalizable samples that incorporate other social network reporters (e.g., children) and/or other types of assessments (e.g., behavioral), as well as replicating sensitivity to change across alternate interventions and/or clinical populations.

5. Conclusion

In sum, we provide evidence of criterion and incremental validity, as well as sensitivity to change in this initial report of the SNQ scales. The SNQ may represent a beneficial addition to future research studies examining changes in social relationship quality, as well as the long-term impact of relationship quality on psychopathology and physical health. Inclusion of the SNQ scales in clinical trials may help to elucidate mechanisms by which social networks impact emotional and physical health outcomes, and to better understand how interpersonally-focused treatments may affect the qualitative impact of extant social network structures.

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Figure 1.
Change in average social network negativity/stress and positivity/support over 12 months with standard error bars.

Figure 2.
Change in number of roles and contacts over 12 months with standard error bars.

Figure 3. Change in positivity/support and negativity/stress in relationships with children over 12 months with standard error bars.

Table 1
Descriptive Statistics of Social Network Quality Scales for Each Social Role and Total Scores

Social Role at/in/with:	Social Role Endorsed N (%)	Contacts by Role Mean (SD; Range)	Negativity/Stress Mean (SD; Range)	Positivity/Support Mean (SD; Range)
Romantic Relationship	108 (67.5%)	0.68 (0.47; 0-1)	2.19 (0.98; 0-4)	2.45 (0.95; 0-4)
Children	157 (98.1%)	2.71 (1.44; 0-7)	2.41 (0.85; 0-4)	2.40 (0.84; 0-4)
Parents	113 (70.6%)	1.02 (0.78; 0-2)	1.32 (1.11; 0-4)	2.80 (1.09; 0-4)
In-Laws	40 (25.0%)	0.33 (0.61; 0-2)	1.02 (1.19; 0-4)	2.33 (1.33; 0-4)
Other Relatives	106 (66.3%)	1.33 (1.44; 0-7)	0.91 (0.96; 0-4)	3.08 (0.88; 0-4)
Close Friends	130 (81.3%)	1.89 (1.57; 0-7)	0.66 (0.76; 0-4)	3.38 (0.72; 0-4)
Religious Group	54 (33.8%)	1.14 (2.09; 0-7)	0.43 (0.57; 0-2)	3.26 (0.96; 0-4)
School	14 (8.8%)	0.38 (1.40; 0-7)	0.50 (0.52; 0-1)	3.36 (0.63; 0-4)
Work	99 (61.9%)	2.69 (2.76; 0-7)	1.27 (0.91; 0-4)	2.73 (0.90; 0-4)
Neighbors	85 (53.1%)	1.23 (1.54; 0-7)	0.48 (0.84; 0-4)	2.78 (1.27; 0-4)
Volunteer Work	23 (14.4%)	0.43 (1.31; 0-7)	0.78 (0.85; 0-2)	3.17 (0.78; 0-4)
Social, Work, or Parent Groups	52 (32.5%)	0.51 (1.38; 0-7)	0.70 (0.87; 0-3)	3.00 (1.00; 0-4)
Total Social Roles		Total Contacts	Total Negativity/Stress	Total Positivity/Support
Mean (SD)	5.98 (1.86)	Mean (SD)	Mean (SD)	Mean (SD)
Range	1-11	Range	Range	Range
		14.34 (6.77)	1.34 (0.59)	2.75 (0.63)
		3-33	0.25-3.60	1.20-3.88

Note: N = 160. Each social role represents an item on each scale. Although all participants are mothers, three participants reported not having contact with their children at least once every two weeks. The calculation of average number of contacts by role includes participants who did not endorse that role and, thus, have zero contacts for that role. The full available range for number of contacts was used on each item; thus, the maximums on these items also represent the maximum number of contacts that can be reported on each item. Negativity/stress and positivity/support scales for each person were calculated by averaging the positive and negative ratings across all social roles that were endorsed.

Correlations between the Social Network Quality Scales and Proximal and Distal Theoretically-Related Constructs

Table 2

Measure	SNQ	SNI	ISEL	IIP	ECR-Ax	ECR-Av	HRSD-17	MASQ-AD	MASQ-AA
1. SNQ Negativity/Stress	.51***	-.36***	-.39***	.29***	.32***	.31***	.29***	.33***	.24**
2. SNQ Positivity/Support		.36***	.37***	-.30***	-.34***	-.42***	-.33***	-.42***	-.25**
3. SNI Number of Roles		.72***	.28**	-.16*	-.13 [†]	-.35***	-.32***	-.37***	-.31***
4. SNI Number of Contacts			.22**	-.17*	-.07	-.27***	-.33***	-.30***	-.23**
5. ISEL			.85	-.29***	-.42***	-.47***	-.35***	-.36***	-.20*
6. IIP				.89	.37***	.38***	.37***	.29***	.21**
7. Attachment Anxiety					.94	.29***	.18*	.16*	.21**
8. Attachment Avoidance						.95	.35***	.33***	.29***
9. HRSD-17								.54***	.44***
10. MASQ-AD								.91	.26**
11. MASQ-AA									.89

Note. SNQ = Social Network Quality; SNI = Social Network Index; ISEL = Interpersonal Support Evaluation List; IIP = Inventory of Interpersonal Problems; ECR = Experiences with Close Relationships; Ax = Attachment Anxiety; Av = Attachment Avoidance; HRSD = Hamilton Rating Scale for Depression; MASQ = Mood and Anxiety Symptoms Questionnaire; AD = Anhedonic Depression; AA = Anxious Arousal. Internal consistency (α) scores for the applicable measures are reported along the diagonal.

[†]
p < .10.

*
p < .05.

**
p < .01.

p < .001.

Table 3
Hierarchical Multiple Regressions Demonstrating Incremental Validity of Social Network Quality Scales

Variable	Social Support (ISEL)		Interpersonal Problems (IIP)		Attachment Anxiety (ECR-Ax)		Attachment Avoidance (ECR-Av)		Depression (HRSD-17)		Anhedonic Depression (MASQ-AD)		Anxious Arousal (MASQ-AA)	
	β	R^2	β	R^2	β	R^2	β	R^2	β	R^2	β	R^2	β	R^2
Step 1		.10***		.03 [†]		.02		.13***		.12***		.14***		.10***
Roles	.31**		-.09		-.17		-.33**		-.17		-.33**		-.31**	
Contacts	.02		-.10		.05		-.03		-.21 [†]		-.06		-.01	
Step 2		.24***		.08**		.13***		.10***		.05**		.11***		.03 [†]
Roles	.17 [†]		.00		-.07		-.25*		-.10		-.24*		-.26*	
Contacts	-.10		-.03		.15		.05		-.15		.02		.03	
Negative	-.15 [†]		.17 [†]		.21*		.07		.10		.11		.10	
Positive	.46***		-.19*		-.26***		-.31**		-.19*		-.29***		-.12	

Note. Standardized beta weights are reported here. ISEL = Interpersonal Support Evaluation List; IIP = Inventory of Interpersonal Problems; ECR = Experiences with Close Relationships; Ax = Attachment Anxiety; Av = Attachment Avoidance; HRSD = Hamilton Rating Scale for Depression; MASQ = Mood and Anxiety Symptoms Questionnaire; AD = Anhedonic Depression; AA = Anxious Arousal.

[†] p < .10.
* p < .05.
** p < .01.
*** p < .001.