HETEROGENEITY IN SOCIAL NETWORKS: A COMPARISON OF DIFFERENT MODELS LINKING RELATIONSHIPS TO PSYCHOLOGICAL OUTCOMES

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We examined the utility of a broad conceptual framework that highlights the natural heterogeneity that exists in social networks. From this framework, we contrasted the positivity, negativity, outcome-specific, and ambivalence models in predicting psychological distress and well-being in 209 men and women using a cross-sectional design. Results revealed that the numbers of supportive and aversive ties were independent predictors of psychological distress and well-being. However, supportive ties were stronger predictors of psychological distress than aversive ties. The number of ambivalent ties was also an independent predictor of psychological distress compared to aversive ties. Consistent with our framework, failure to methodologically separate the co-occurring postivity and negativity in social relationships obscured associations between relationships and psychological outcomes. Conceptual and methodological implications of this general framework for the study of social networks and mental health are discussed.

The quality and quantity of one's social relationships have been reliably related to mental and physical health outcomes (Berkman, 1995; Cohen,

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1988; Thoits, 1983; Uchino, 2004). These data are often taken as evidence for the benefits of close, confiding relationships. However, even close relationships are not uniformly positive (Braiker & Kelly, 1979). Research suggests that negativity in social relationships is an important predictor of mental health in its own right (Rook, 1984; Sandler & Barrera, 1984). In fact, the contribution of both positivity and negativity in the study of social relationships and mental health has not been adequately examined (Rook, 1998). This is noteworthy because positive and negative aspects of social relationships tend to be separable dimensions (Finch, Okun, Barrera, Zautra, & Reich, 1989). Even when moderate negative correlations have been found, positive and negative aspects of social relationships still appear to represent distinct, separable factors (Pierce, Sarason, & Sarason, 1991).

In the present study we contrasted several models of the mental health effects of positivity and negativity in social relationships. It is clear that social support predicts better psychological outcomes (Sarason, Sarason, & Pierce, 1990). One model (positivity model) thus predicts that positive aspects of social relationships will be a strong predictor of better mental health. However, several studies have found that negative aspects of social relationships appear to be stronger predictors of psychological outcomes compared to positive aspects of social relationships (Finch et al., 1989; Rook, 1984). A second model (negativity model) would thus predict that negativity in social relationships would be a stronger independent predictor of negative psychological outcomes even when considering positive aspects of social relationships.

In a noteworthy review of these models, Rook (1998) argued that research attempting to examine the relative influence of positivity and negativity in social networks has been limited due to several methodological issues. For instance, studies have assessed negativity in relationships at differing levels of specificity than positivity in relationships. A crucial test of the two models would require that researchers not assess one dimension more broadly than the other (e.g., comparing positivity regarding supportive interactions with negativity across all types of interactions). Rook (1998) also noted that the time frames of the positivity and negativity assessments need closer attention. For instance, problems in comparing these models would arise if positivity in relationships was assessed in response to acute events, whereas negativity in relationships was assessed in regards to more chronic events. In fact, the available evidence suggests that prior research may have not provided a fair test of the relative influence of positivity and negativity in social networks due to these methodological factors (Rook, 1998). In the present study, participants completed the social relationships index (SRI) that assesses how helpful and upsetting a specific net-

work member is when the participant needs social support. As a result, the domain and time frame associated with each assessment are held relatively constant so that a crucial test may be conducted of the positivity and negativity models.

It is possible, however, that the positivity and negativity models are not competing perspectives (Finch et al., 1989; Ingersoll-Dayton, Morgan, & Antonucci, 1997). For instance, Finch and colleagues (1989) argue that there may be outcome-specific effects as a function of positive and negative social ties. These authors suggest that positive social ties are more likely to predict measures of psychological well-being (e.g., satisfaction with life), whereas negative social ties are more likely to predict outcomes associated with psychological distress (e.g., depression). In the present study, we included measure of satisfaction with life, perceived stress, and depression to also contrast the predictions made by the outcome-specific model.

We should note that research on the separability of positivity and negativity in social relationships suggests a more heterogenous organization to social networks and their prediction of mental health than the positivity, negativity, and outcome-specific models (Uchino, Holt-Lunstad, Uno, & Flinders, 2001). That is, there appear to be network members that are characterized by feelings of both positivity and negativity (Barrera, 1980; Fincham & Linfield, 1997; Uchino et al., 2001). This view is consistent with research indicating that the positive and negative aspects of attitudes can be co-activated under some circumstances (e.g., Cacioppo & Berntson, 1994; Priester & Petty, 1996; Thompson, Zanna, & Griffin, 1995).

This more general organization for predicting the outcomes associated with social relationships is depicted in Figure 1. As shown in the high positivity/low negativity corner, there may be social network members that are primarily sources of social support or other pleasant interpersonal experiences (e.g., supportive coworkers). The low positivity/high negativity corner reflects network ties that are primarily sources of negativity or what we label a socially aversive tie (e.g., an unreasonable work supervisor). The low positivity/low negativity corner is labeled social indifference and may represent a network tie that is characterized by relatively low frequency, depth, or importance (e.g., casual co-workers). Finally, the high positivity/high negativity corner contains a prototypical ambivalent network tie. Such ties are network members that are a source of both positivity and negativity. For instance, negative interactions with individuals that in the past have been sources of positive interactions (e.g., supportive co-workers) may result in strong perceptions of ambivalence in these relationships.
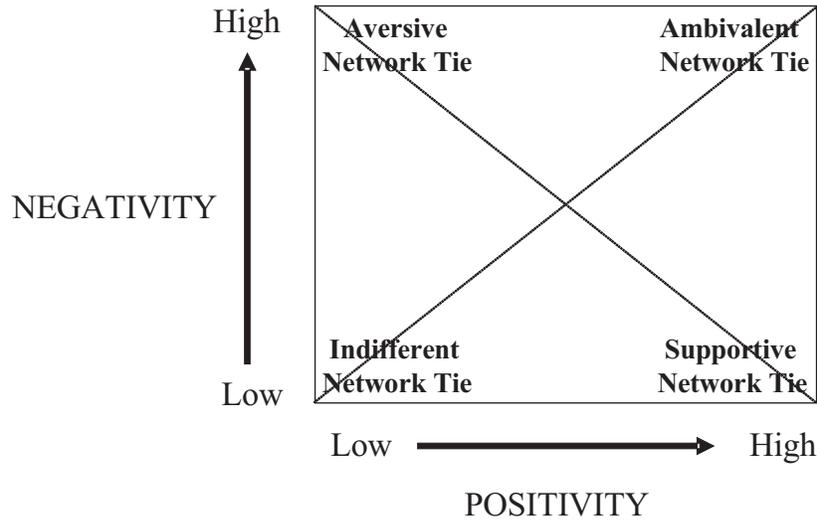
FIGURE 1. General conceptual framework incorporating the positive and negative bases of relationships on mental health.

The implications of separating ambivalent ties from more purely positive and negative ties have not received sufficient conceptual or methodological attention in the prior literature. As outlined in Figure 1, high negativity includes both socially aversive and socially ambivalent ties, whereas high positivity includes both socially supportive and socially ambivalent ties. One important implication of this framework is that by ignoring the co-occurrence of positivity and negativity within some relationships, prior research may have masked the effects of these heterogeneous network types and obscured reliable associations between social relationships and psychological outcomes. This is important because in our prior research we have found ambivalent ties to predict increased levels of interpersonal stress (Uchino et al., 2001). This interpersonal stress associated with ambivalent ties may limit effective social support or lead individuals to withdraw from their social network (Lepore, Evans, & Schneider, 1991). Thus, a potentially important additional model suggested by Figure 1 is that ambivalent ties may be an independent predictor of negative psychological outcomes (ambivalence model) in its own right.

In the present study, we tested the utility of Figure 1 by separating ambivalent, supportive, and aversive network ties in an attempt to contrast the different models and their prediction of various relationship variables (e.g., contact, importance) and psychological outcomes. Based on Figure 1, we predicted that separating out these network ties would result in greater support for the positivity model. That is, separating network ties that are truly supportive from those that are more ambivalent would result in stronger evidence for the positivity model than has been the case in prior research. In comparing ambivalent and aversive ties, we predicted that ambivalent ties may be more consequential because interactions with such network members may occur more frequently and/or any given interaction may be a stronger source of interpersonal stress (Uchino et al., 2001). Although the framework in Figure 1 also makes salient the categorization of indifferent ties, the association between this category of relationships and psychological outcomes was treated in a more exploratory fashion given the lack of prior research (e.g., Uchino et al., 2001).

As a second aim, we also examined the implications of Figure 1 for prior research comparing the positivity, negativity, and outcome specific models. We have argued that failure to separate out these different relationship categories may have obscured associations between relationships and psychological outcomes. In order to examine this question, we compared these models when relationships were operationalized according to Figure 1 or according to prior research that ignores the co-occurring positivity and negativity in a subset of social network members. We predicted that although prior research tends to favor the negativity model, this is primarily the case because of the failure to separate the opposing effects associated with supportive ties and ambivalent ties.

METHOD

PARTICIPANTS AND PROCEDURES

In exchange for one hour of participation in the study, 219 undergraduates participated in the study and received course extra credit. Ten participants did not provide gender information and were excluded from the analyses. The final sample consisted of 100 men and 109 women who completed the scales detailed below.

QUESTIONNAIRES

Social Relationships Index (SRI). The SRI was developed as a self-report version of the social support interview (Fiore, Becker, & Coppel,

1983; Kiecolt-Glaser et al., 1991; Uchino et al., 2001). The SRI instructed individuals to list the initials of individuals in the following domains: (a) spouse/significant other, (b) father, (c) mother, (d) other family, (e) friends, (f) co-workers, and (g) social acquaintances. The categories of other family, friends, co-workers, and social acquaintances were limited to five people in order to keep completion of the SRI to a manageable time frame. Each individual listed was then rated on how (a) helpful (1 = not at all, 6 = extremely) and (b) upsetting (1 = not at all, 6 = extremely) they were when the participant needed social support. In our pilot work, these network assessments of helpful and upsetting ratings were temporally stable with significant 2-week test-retest correlations of $r = .81$ ($p < .001$) for helpful and $r = .83$ ($p < .001$) for upsetting. Ratings of perceived relationship importance and weekly contact were also obtained for each listed network member.

Consistent with Barrera (1980) and Rook (1984), we operationalized different categories of social relationships as the total number of individuals in one's network who were only sources of positivity (i.e., supportive ties—number of individuals rated as greater than "1" on helpful and only "1" on upsetting), only sources of negativity (i.e., aversive ties—number of individuals rated as only "1" on helpful and greater than "1" on upsetting), sources of no positivity and no negativity (i.e., indifferent ties—number of individuals rated as only "1" on helpful and upsetting), or sources of both positivity and negativity (i.e., ambivalent ties—number of individuals rated as greater than "1" on both helpful and upsetting).[1] The total number of supportive, aversive, indifferent, or ambivalent network ties were computed across relationship domains to increase measurement reliability.

As further evidence for the validity of the SRI, we developed a criterion measure for psychologically experienced ambivalence as described by prior researchers (Priester & Petty, 1996). These questions instructed participants to rate the same people listed in the SRI on how mixed their thoughts, how conflicted their feelings, and how indecisive their atti-

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1. One potential issue with using a "threshold" approach to classify individuals is the specification of a cut-off point. In the present study, we used a conservative cut-off point that specified any degree of positivity or negativity for supportive, aversive, and ambivalent ties (i.e., rating greater than "1"). It is worth mentioning that compared to other empirical approaches we have found the correlation with other cut-off points to be high. In fact, the correlation between the number of supportive ties using a cut-off point of "1" versus "3" in the current study is strong and significant ($r = .82$). Importantly, despite the more conservative approach, we have found our present classification scheme to be a sensitive discriminator of various outcomes (e.g., well-being, cardiovascular function) in our prior studies (Uchino et al., 2001).

tudes are concerning the network member when they need support (1 = not at all, 6 = extremely). Similarly to the SRI, we then categorized individuals as sources of ambivalence if their mean rating was greater than "1," then summed the number of ambivalent ties across relationship domains. Importantly, this index was significant correlated with the number of ambivalent ties as assessed by the SRI ($r = .36$, $p < .001$), but was not significantly correlated with the number of supportive ($r = .09$), aversive ($r = .08$), or indifferent ($r = .09$) ties.

Perceived Stress Scale (PSS). The PSS assesses the extent to which individuals appraise their life to have been stressful during the past month (Cohen & Williamson, 1988). This measure has been internally consistent in prior research with an alpha coefficient of about .78. The Chronbachs alpha for the PSS in our study was high (.87). In prior research, high scores on the PSS have been associated with poorer health and more health service utilization (Cohen & Williamson, 1988).

Beck Depression Inventory (BDI). The BDI contained 21 clinically derived items and appears to be a reliable and valid measure of depression (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961; Beck, 1974). Beck et al. (1961) reported a split-half correlation of .86 for the BDI. In addition, the BDI is related to clinical ratings of depth of depression. In our study, the BDI was internally consistent (alpha = .87) with a mean score of 8.29 (*SD* = 7.0). Thus, individuals in our sample had BDI scores that would be described as dysphoric to mildly depressed (Ingram & Hamilton, 1999; Flett, 1997).

Satisfaction With Life Scale (SWLS). The SWLS contained five items and assessed global life satisfaction (Diener, Emmons, Larson, & Griffin, 1985). Diener and colleagues (1985) reported an internal consistency of .87 and retest correlation of .82. The internal consistency of the SWLS in the current study was similarly high (.90). As evidence for the validity of the SWLS, individuals satisfied with their lives were well-adjusted and relatively free of psychopathology (Pavot & Diener, 1993).

RESULTS

PRELIMINARY ANALYSES

We first examined the average number of network members categorized from the SRI. As shown in Table 1, the numbers of supportive and ambivalent ties were comparable and made up the majority of social network members compared to aversive and indifferent ties. This distribution was significant ($\chi^2 = 15.93$, df = 3, $p < .01$) and is consistent with our prior research with younger and older adults suggesting that

TABLE 1. Average number of individuals in each social network categories (n = 209).

Variable	Mean	SD
Supportive ties	9.40	5.60
Ambivalent ties	9.39	5.45
Aversive ties	0.38	0.74
Indifferent ties	0.65	1.30

supportive and ambivalent ties make up a sizable portion of most individuals' social networks (Uchino & Cacioppo, 1997; Uchino et al., 2001).

We next examined the association between these categories of relationships and the assessments of relationship importance and weekly contact. One would expect that any relationship with some degree of negativity might be associated with lower ratings of importance and contact. To test this possibility, we conducted separate regression analyses in which we entered the number of either supportive, aversive, indifferent, or ambivalent ties.[2] As shown in Table 2, results revealed that the number of supportive ties predicted a higher assessment of relationship importance (p = .05). In comparison, the number of aversive (p < .01) and indifferent (p < .001) ties predicted lower ratings of relationship importance. However, only the number of indifferent ties predicted lower levels of weekly contact (p < .02). Thus, although most of these networks differed in their rated importance, they did not predict weekly contact suggesting some degree of situational constraint on these network interactions.

For our main analyses, we first examined the univariate prediction of perceived stress, depression, and satisfaction with life via the different categories of relationships. These analyses were done in order to (a) replicate prior research and (b) provide information on the simple prediction between less examined network ties (i.e., ambivalent, indifferent) with these outcomes. Second, we directly contrasted the positivity, negativity, and outcome-specific models by examining the relative prediction of these outcomes via supportive and aversive ties. Third, we examined the ambivalence model by comparing the relative prediction of these outcomes via ambivalent tie and (a) aversive ties, or (b) supportive ties. Finally, we examined the implications of Figure 1 for prior research by contrasting these models using analyses that failed to consider the

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2. Exploratory analyses revealed that gender did not moderate any of the associations reported in this manuscript, so it was excluded from the analyses.

TABLE 2. Results (β) from separate regression analyses examining the simple association between specific network categories and relationship/psychological outcomes

Variable	Relationship Importance	Relationship Contact	Perceived Stress	Depression	Satisfaction with Life
Supportive Ties	.13*	−.02	−.18**	−.24**	.18**
Ambivalent Ties	−.12	−.03	.19**	.23**	−.05
Aversive Ties	−.21**	.00	.13*	.14*	−.17*
Indifferent Ties	−.37**	−.17*	.04	.03	−.20**

Note: * = $p \leq .05$, ** = $p < .01$.

co-occurring positive and negative aspects of some relationships with analyses made salient by our framework.

INDIVIDUAL SOCIAL NETWORK CATEGORIES AND PSYCHOLOGICAL OUTCOMES

In the first set of analyses, we used separate regression analyses to examine the individual prediction of the psychological outcomes via these different categories of social relationships (see Table 2). Replicating prior research, the number of supportive ties predicted decreased perceived stress ($p < .01$), decreased depression ($p < .001$), and increased satisfaction with life ($p < .01$). Consistent with the importance of purely negative ties on psychological outcomes, the number of aversive ties predicted increased perceived stress ($p = .05$), increased depression ($p < .05$), and decreased satisfaction with life ($p < .02$). Interestingly, the number of indifferent ties did not predict depression or perceived stress but instead lower levels of life satisfaction ($p < .01$). Consistent with our prior research and the potential importance of ambivalent relationships, the number of ambivalent ties predicted higher levels of perceived stress ($p < .01$) and depression ($p < .001$).

SPECIFIC MODEL COMPARISONS

We next examined the positivity, negativity, and outcome-specific models by entering the number of supportive and aversive ties in a simultaneous regression analyses. As shown in Table 3, both the number of

TABLE 3. Results (β) of Model Comparisons Using Simultaneous Regression Analyses

Positivity, Negativity, and Outcome Specific Model Comparisons

	Perceived Stress		Depression		Satisfaction With Life	
Variables	β	d	β	d	β	d
Supportive Ties	−.18*	.32	−.24**	.48	.17*	.32
Aversive ties	.13*	.21	.13*	.23	−.16*	.30
Ambivalence and Negativity Model Comparisons						
Ambivalent ties	.20**	.37	.23**	.46	−.05	.01
Aversive ties	.14*	.24	.15*	.27	−.17*	.31
Ambivalence and Positivity Model Comparisons						
Ambivalent ties	.13	.13	.11	.10	.16	.18
Supportive ties	−.09	.05	−.16	.19	.29**	.39

Note. d = Cohen's d, * = $p \le .05$, ** = $p < .01$.

supportive and aversive ties were independent predictors of perceived stress, depression, and satisfaction with life. In these analyses, the number of supportive ties predicted lower perceived stress ($p < .02$), lower depression ($p < .001$), and higher satisfaction with life ($p < .02$). In comparison, the number of aversive ties predicted higher perceived stress ($p = .06$), greater depression ($p < .05$), and lower satisfaction with life ($p < .02$). Further examination of effect size estimates provided in Table 3 (Cohen's d), however, suggests that the number of supportive ties was a relatively stronger predictor of perceived stress and depression compared to aversive ties. These results are consistent with the positivity model but inconsistent with the negativity model which predicts greater effect sizes for aversive ties. It is also inconsistent with the outcome specific model that predicts larger effects for positive ties on well-being measures only.

We next examined the ambivalence model by testing the additional variance in these psychological outcomes associated with ambivalent ties compared to (a) aversive ties and (b) supportive ties. Results of simultaneous regression analyses depicted in Table 3 suggest that ambivalent ties were indeed an independent predictor of higher perceived stress ($p < .01$), greater depression ($p < .001$), but not satisfaction with life ($p > .47$) compared to aversive ties. Examination of the effect size estimates further suggests that ambivalent ties were relatively stronger predictors of perceived stress and depression, whereas aversive ties were a stronger predictor of satisfaction with life. However, the number of am-

bivalent ties was not an independent predictor of these psychological outcomes when considering the influence of supportive ties.[3]

THE IMPORTANCE OF SEPARATING AMBIVALENT TIES FROM SUPPORTIVE TIES

The results of this study thus far are consistent with the broad framework depicted in Figure 1. We have also argued, however, that failure to take into account the co-occurring positive and negative aspects of relationships (e.g., ambivalent ties) may obscure associations between relationships and psychological outcomes. Note that this is particularly important in the case of supportive ties as the number of ambivalent network ties predicted opposing effects on psychological outcomes compared to supportive ties. In order to test our proposition, we repeated our analyses by re-categorizing network members as (a) sources of support based only on their positivity ratings (i.e., helpful > 1) or (b) sources of aversion based only on their negativity ratings (i.e., upsetting > 1). This procedure conceptually replicates much prior research on social networks and psychological outcomes by ignoring the co-occurrence of positivity and negativity (ambivalence) within some relationships.

In these re-analyses, the number of "supportive" and "aversive" ties was entered in a simultaneous regression analyses. Results revealed that the number of aversive ties was an independent predictor of greater perceived stress ($\beta = .23$, $p < .01$) and depression ($\beta = .29$, $p < .001$), and marginally related to lower satisfaction with life ($\beta = .-13$, $p = .06$). The number of supportive ties was an independent predictor of greater satisfaction with life ($\beta = .20$, $p < .01$). Although these analyses suggest greater evidence for the outcome-specific model, this is due to the fact that ambivalent and supportive ties predict opposite effects on psychological outcomes. Thus, combining these ties by ignoring the existing level of negativity that occurs in a subset of these positive relationships results in weaker effects for what in the past has been labeled as "supportive" ties.

To further illustrate this point, we also examined the buffering model of social support using both methods of assessing "supportive" ties. The

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3. Preliminary analyses revealed that the only substantial correlation among the network types were between the number of ambivalent and supportive ties ($r = -.70$, $p < .01$). However, despite the high intercorrelation among these network ties, analyses reported in Table 3 revealed that they were not interchangeable variables. Supportive ties continued to be an independent predictor of higher satisfaction with life ($p < .01$) and tended to predict lower depression ($p = .09$) even when considering the number of ambivalent ties.

classic buffering response is seen when social support moderates the association between levels of stress and depression (Cohen & Wills, 1985). In these analyses (see Cohen & Cohen, 1983), we first centered each main effect variable and then calculated the cross-product term between (a) perceived stress and supportive ties—separated from ambivalent ties, and (b) perceived stress and supportive ties—ignoring co-occurring ratings of negativity. When supportive ties were operationalized by ignoring their negative aspects, a buffering effect was not evident (β = -.04, $p >$ .43). However, as shown in Figure 2, analyses separating purely supportive from ambivalent ties showed the classic stress-buffering effect of social support on depression (β = -.11, $p < .05$). That is, these purely supportive ties were associated with lower depression primarily for individuals under relatively high levels of perceived stress.

DISCUSSION

The main aim of this study was to utilize Figure 1 in order to provide a test of the positivity, negativity, outcome-specific, and ambivalence models. In providing such a test, we improved on various methodological issues that may have obscured prior research (see Rook, 1998). It is important to note that our analyses replicated much of the prior research examining the simple (univariate) influence of supportive and aversive ties on relationship variables and psychological outcomes. Our results further suggest that prior research may have underestimated the influence of supportive ties on psychological outcomes, a conclusion made salient by the specification of ambivalent network ties.

Overall, the results of the present study lend greater conceptual support to the positivity model rather than the negativity or outcome-specific models. Although these data diverge from prior research (Finch et al., 1989; Rook, 1998), they are interpretable in light of the conceptual framework depicted in Figure 1. Importantly, this framework makes salient the point that high positivity includes both supportive and ambivalent ties, whereas high negativity includes both aversive and ambivalent ties. As shown in this study, problems may arise by not separating ambivalent ties from their more "pure" counterparts. Note that this problem is particularly problematic when one considers only levels of positivity as an indicator of supportive ties because network members who were sources of ambivalence did not appear to be an isolated feature of one's social network and it predicted *greater* perceived stress and depression. Failure to account for this co-occurring positivity and negativity in some relationships is likely to obscure the *lower* levels of psychological distress associated with purely supportive ties.
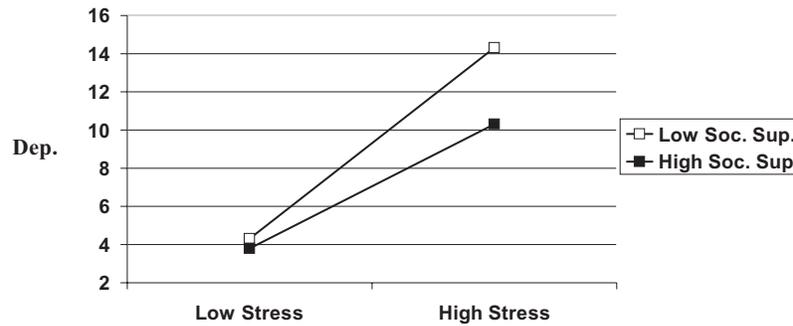
FIGURE 2. Predicted depression scores one *SD* above and below the mean for levels of stress and the number of purely supportive ties using unstandardized parameter estimates.

At the conceptual level this framework also highlights the promise of studying ambivalent network ties in their own right. The importance of ambivalent ties is highlighted by the fact that they do not appear to be an isolated feature of individuals' social networks. We have now found in several studies that ambivalent ties make up a significant proportion of listed network members using both undergraduate and community samples (Uchino et al., 2001). In fact, a closer examination of the breakdown of social ties for this study suggests roughly equivalent numbers of ambivalent and supportive ties for most of the relationship domains (e.g., family, friends, co-workers). Our results also did not indicate that these ambivalent social ties were associated with less contact. It may be the nature of ambivalent ties (co-existing positive feelings) that makes these ties difficult to avoid or exit. Although more research is needed on the nature of ambivalent ties, these data suggest the pervasiveness of such ties and their potential to influence outcomes across a wide variety of contexts.

The importance of ambivalent ties was also evident when contrasted with aversive ties. Relative to aversive ties, ambivalent ties appeared to be stronger predictors of psychological distress. Ambivalent ties may be more powerful, at least compared to aversive ties, because interactions with such network members may occur more frequently and any given interaction may be a stronger source of interpersonal stress. For instance, one may adapt to interactions with aversive ties by using various coping strategies such as discounting or ignoring the aversive network

member. However, the co-occurring positivity and negativity associated with ambivalent ties makes them relatively more unpredictable, which may lead to heightened emotional responses or ruminative thinking. Although this explanation does not account for why ambivalent ties did not predict satisfaction with life, Ryff and Keyes (1995) have argued that the structure of well-being is multidimensional (e.g., self-acceptance, environmental mastery). Future research using more detailed assessments of well-being will be necessary to test the implications of this premise.

Although we found that ambivalent ties did not predict psychological outcomes when considered simultaneously with supportive ties, the influence of ambivalent ties may be more powerful in other contexts and populations. For instance, Hansson et al. (1990) found that many older adults were able to recount acts of betrayal by members of their support network that maintained its significance in later life. These data suggest that ambivalent network members may cast "long shadows" and perhaps evidence a stronger cumulative influence after longer periods of time. Consistent with the importance of considering ambivalent ties in older individuals, we found in a prior study that the associations between ambivalent ties and depression were stronger in older, compared to younger, individuals (Uchino et al., 2001). We further found the number of ambivalent ties to predict an age-associated increase in cardiovascular sympathetic reactivity (i.e., heart rate and pre-ejection period) during acute psychosocial stress. These associations were evident even after statistically controlling for the other categories of relationships.

Results of the present study may appear inconsistent with prior attitudinal research on the primacy of negativity or what has been termed a negativity bias (Cacioppo & Berntson, 1994). It is important to point out, however, that this negativity bias is most pronounced at higher ratings of negativity (Cacioppo & Berntson, 1994). Consistent with prior research, levels of negativity in our sample were relatively low. As a result, care must be taken in attempting to generalize these data to situations that involve interactions with a higher number of aversive ties. Despite their low prevalence, however, aversive ties were still independent predictors of these psychological outcomes. These data highlight the continued importance of examining aversive ties in future populations.

There are several important limitations of the present study that should be noted. Although there is relatively strong evidence linking social relationships to changes in psychological well-being (e.g., Monroe et al, 1986; Pagel et al., 1987), the cross-sectional design used in our study does not allow us to conclude that these relationship categories are causal factors in determining psychological outcomes. For instance, it is possible that participants' present mental health may be influencing

their ratings of their relationships. We should note that a simple explanation based on the influence of current mental health (or other potential confounding variables) does not appear to provide a straight-forward explanation for the complex associations we found as a function of positive, negative, and ambivalent ties on psychological outcomes. Nevertheless, future studies that examine these questions prospectively would be needed to definitively address this issue. Prospective studies would also be useful to examine both short-term and longer-term effects potentially associated with different categories of social networks.

Although our methodological approach of holding the assessment domain constant (i.e., specific network ties when one needs support) was useful to provide a crucial test in that domain, it does not allow us to generalize across all interactional contexts (e.g., everyday interactions). Future research that directly compares these models across differing contexts would be important to establish the generality of our findings. Finally, more validation studies need to be done in the assessment of these different categories of relationships. At a minimum, the larger conceptual framework driving this study would require one to assess both positivity and negativity in social networks. To date, there are only a few other measures that might allow for such a comprehensive assessment of social relationships (Arizona social support schedule—Barrera, 1980; quality of relationships inventory—Pierce, Sarason, & Sarason, 1991). Further validation studies would be helpful to better characterize the antecedent processes, as well as consequences, of relationships that are less specified in present models of social relationships and health.

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