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Understanding the Relationship Between PTSD and Social Support: The Role of Negative Network Orientation

Joshua D. Clapp^a and J. Gayle Beck^b

^a University at Buffalo – SUNY, Department of Psychology, Park Hall, Buffalo, NY, 14260, United States

^b University of Memphis, Department of Psychology, 202 Psychology Building, Memphis, TN 38152, United States

Abstract

Network orientation is conceptualized as an individual's attitudes and expectations regarding the usefulness of support networks in coping with stress. The present research examined the potential for network orientation to explicate the well documented association between posttraumatic stress disorder (PTSD) and attenuated social support. Data collected from survivors of serious motor vehicle trauma ($N = 458$) were used to test the hypothesis that severity of PTSD would hold a significant indirect relationship with social support through negative network orientation. Childhood victimization and elapsed time from the accident were examined as potential moderators of this indirect relationship. Consistent with hypotheses, path analyses demonstrated a significant indirect relationship between PTSD and social support through negative network orientation. Specifically, this indirect effect was the result of a direct association between PTSD severity and negative network orientation and an inverse association between negative network orientation and social support. This pattern of relationships was invariant across mode of PTSD assessment (interview vs. self-report). No moderation effects were noted. These data suggest that network orientation may be an important factor in understanding interface of interpersonal processes and posttrauma pathology.

Keywords

PTSD; social support; network orientation; motor vehicle accidents; MVA

1. Introduction

The inverse association between symptoms of posttraumatic stress disorder (PTSD) and social support is one of the most consistent relationships observed in trauma research (Brewin, Andrews, & Valentine, 2000; Ozer, Best, Lipsey & Weiss, 2003). Some evidence indicates that PTSD may result in the erosion of social support (e.g., Keane, Scott, Chavoya, Lamparski, & Fairbank, 1985; King, Taft, King, Hammond, & Stone, 2006; Laffaye, Cavella, Drescher, & Rosen, 2008), but little research to date has examined specific factors that contribute to this process. The larger social support literature suggests that perceptions of support networks may play a crucial role in determining the degree to which individuals are willing to seek out and

Correspondence concerning this article should be sent to Joshua D. Clapp at: Department of Psychology, University of Memphis, 202 Psychology Building, Memphis, TN 38152, Phone: 901-678-2914, Fax: 901-678-2579, e-mail: joshclapp@yahoo.com.

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utilize social resources (Tolsdorf, 1976). The present study examines the potential for these perceptions to elucidate the relationship between PTSD and social support among survivors of serious motor vehicle trauma.

Recent meta-analysis (Ozer et al., 2003) indicates a robust association between PTSD and social support (weighted $r = -.28$; $CI_{95} = -.40, -.15$). This association historically has been interpreted within the framework of Cohen and Will's (1985) stress buffering model. Although not specific to traumatic stress per se, this model posits that supportive social networks help individuals cope with stressful events (e.g., interpersonal conflict, occupational stress) and buffer against the development of stress-related psychopathology. More recently, however, trauma researchers have begun to explore an alternative model wherein symptoms of PTSD contribute to the erosion of social support over time (King et al., 2006; Laffaye et al., 2008). The erosion model suggests that symptoms associated with PTSD (e.g., social withdrawal, numbing, excessive anger) negatively impact the quality and quantity of received support.

Both models provide plausible accounts for the association between PTSD and social support, but direct evidence supporting either model is limited. Longitudinal data consistently demonstrate an association between social support assessed at some point after trauma exposure and the severity of subsequent PTSD symptoms (e.g., Koenen, Stellman, Stellman, Sommer, 2003; Kramer & Green, 1991; Perry, Difede, Musngi, Frances, & Jacobsberg, 1992). These prospective associations, however, do not control for PTSD severity at the initial assessment nor do they examine the potential relationship between initial PTSD and subsequent decreases in social support. Recent analyses by King et al. (2006) address these limitations through examination of relationships proposed by both the stress buffering and erosion models. This report measured PTSD severity and social support in a sample of Gulf War veterans ($N=2249$) 18–24 months post-return and again 5 years after the initial assessment. Data were examined using a cross-lagged panel analyses with pathways specifying relationships between initial social support and subsequent PTSD (i.e., stress buffering model) as well as between initial PTSD and subsequent social support (i.e., erosion model). Both pathways controlled for initial ratings of PTSD and social support. Consistent with the erosion hypothesis, initial PTSD demonstrated a predictive association with subsequent decreases in social support. Social support, however, failed to evidence a predictive association with later PTSD after controlling for initial PTSD severity. Conclusions drawn from this research would be strengthened through replication, but King et al.'s (2006) data provide a compelling examination of competing stress buffering and erosion models.

Whereas debate regarding the directionality of the association between PTSD and social support has dominated this literature, little research has examined factors which may elucidate the nature of this association. What factors serve as intervening variables in the relationship between PTSD and social support? Isolation of relevant factors would bolster the nomological net of relationships between PTSD and social support which may, in turn, inform models regarding the causal nature of their association. In addition, clarification of the processes through which PTSD and social support are related may isolate specific cognitions, behaviors, or environmental factors for use as targets in psychosocial interventions. Given the consistent and relatively strong association between these two variables, the search for intervening factors in this relationship is a promising avenue of research.

Although often oversimplified within the trauma literature, the process of providing and receiving social support is complex, and many factors influence this interpersonal exchange (Norris & Kaniasty, 1996; Charuvastra & Cloitre, 2008). For example, viable social resources may be rendered functionally useless if an individual is reluctant or unwilling to engage his or her social network (Vaux, Burda, & Stewart, 1986). Network orientation refers to one's attitudes and expectations concerning the usefulness of employing social resources in times of

need (Tolsdorf, 1976). This collection of beliefs is hypothesized to develop, in part, as a function of prior experience with support networks. Experiences resulting in perceptions of support members as helpful, receptive, and understanding contribute to the development of a positive network orientation. Experiences resulting in perceptions of support members as rejecting or ineffective, by contrast, contribute to a negative network orientation marked by beliefs that utilization of support is inappropriate, useless, or dangerous. Although associated with social support more generally, network orientation is concerned primarily with specific attitudes and expectations regarding the safety and utility of employing social resources during times of need (Tolsdorf, 1976; Vaux et al., 1986).

Evidence for the construct validity of network orientation is demonstrated primarily through convergent relationships with maladaptive interpersonal attitudes and behaviors. For example, negative network orientation has been shown to be related to self-concealment (e.g., reluctance to disclose problems) and negative attitudes towards help-seeking in Korean college students (Yoo, Goh, & Yoon, 2005). Among pregnant women, positive network orientation has evidenced moderate correlations with support seeking, intimacy, attachment, and relationship quality with their romantic partners (Rini, Schetter, Hobel, Glynn, & Sandman, 2006). Kallstrom-Fuqua, Weston, and Marshall (2004) examined network orientation in a sample of low-income females with a history of sexual abuse. Negative network orientation demonstrated associations with lower levels of trust, greater suspicion of others, and greater avoidance of interpersonal intimacy among women in this sample.

Given the theoretical underpinnings of this construct and the associations observed across these studies, it is reasonable to speculate that network orientation may hold relevance in explicating the relationship between PTSD and social support. Influential models of PTSD posit that trauma exposure results in a fundamental shift in perceptions of the self, others, and the world (e.g., Ehlers & Clark, 2000; Resick & Schnicke, 1992). Negative attitudes regarding the usefulness of support networks may be closely related to these post-trauma perceptual shifts. Changes in the composition of support networks (e.g., passing of loved ones involved in trauma), increased demand from network members, and the emergence of PTSD symptomology also may result in frustration with support systems, further contributing to negative shifts in network orientation. These processes have not been examined within the context of trauma, but research noting decreases in post-trauma social support over time support the plausibility of such associations (e.g., Keane et al., 1985; Kaniasty & Norris, 1993). The primary aim of this research was to examine whether negative network orientation serves as an intervening variable in the association between PTSD and social support.

The present study also takes steps to explore factors that may moderate the indirect association of PTSD and social support through network orientation. Negative interactions with members of the primary support network are thought to be instrumental in the development of a negative network orientation (Tolsdorf, 1976). As such, individuals who experience early victimization (e.g., child physical and/or sexual abuse) may demonstrate a stronger association between PTSD and negative network orientation following adult trauma than those with no victimization history. Also implicit in this theoretical framework is the development of these attitudes *over time* based on prior experiences with support networks (Tolsdorf, 1976). Thus, the strength of the association between PTSD and negative network orientation may increase as a function of time since trauma exposure owing to a longer interval for negative or disappointing interactions to occur. Increases in the magnitude of the association between PTSD and network orientation as a function of these factors may result in a stronger indirect relationship between PTSD and social support through negative network orientation.

The aims of the present research were examined using cross-sectional data collected from survivors of a serious motor vehicle accident (MVA). Both interview and self-report measures

of PTSD were utilized to account for the potential influence of method variance on the observed relationships. With respect to the indirect relationship of PTSD and social support through network orientation, PTSD was expected to hold a direct relationship with negative network orientation which was expected to hold an inverse relationship with social support. These primary hypotheses were tested within the context of two sets of moderation models. The first models examined the moderating effect of childhood victimization (i.e., childhood physical and/or sexual abuse) on the indirect relationship of PTSD and social support through negative network orientation. The indirect relationship between these variables was hypothesized to be stronger among those reporting a history of childhood victimization due to an interaction of PTSD and victimization on network orientation. The second models examined the moderating effect of elapsed time from MVA. Again, the indirect relationship between PTSD and social support through negative network orientation was hypothesized to increase as a function of time owing to an interaction of PTSD and elapsed time from MVA on network orientation.

2. Method

2.1. Participants

Data were collected as part of a research clinic specializing in the assessment and treatment of PTSD following motor vehicle trauma (Beck et al., 2004; Clapp, Beck, Palyo, & Grant, 2008; Grant, Grant, Beck, Marques, Palyo, & Clapp, 2008). Participants were recruited through a variety of sources including health care providers, legal advisors, newspaper advertisements, and public service announcements. An initial telephone contact was used to provide information about the research, and interested participants were scheduled for inclusion. Following provision of consent, participants received a comprehensive interview detailing prior trauma history, characteristics of the target MVA, and the severity of ongoing psychiatric symptomology. Participants were asked to complete an additional battery of self-report measures following the assessment. All procedures were approved by the local Institutional Review Board.

Exclusion criteria were determined during the initial assessment. Of the 503 individuals recruited for participation, eight were excluded owing to MVAs which failed to meet Criterion-A for PTSD (i.e., threatened death or serious injury *and* feelings of intense fear, helplessness, or horror; APA, 1994). Eighteen evidenced significant cognitive impairment as evidenced by a score of 23 or less on the Mini-Mental State Examination (MMSE; Folstein, Folstein, & McHugh, 1975). Seven reported ongoing substance abuse, nine were diagnosed with severe psychopathology (e.g., psychosis), and two reported suicidal ideation requiring hospitalization. A final participant was excluded due to insufficient English for completion of the assessment.

The final sample ($N = 458$) was predominantly Caucasian (81.0%) and female (72.3%). Participants ranged in age from 18 to 80 ($M = 42.3$, $SD = 12.2$). Approximately 47% of participants were married, 27.1% identified as single, and 14.0% as divorced. The remainder of the sample identified as cohabitating (5.2%), separated (4.1%), or widowed (2.6%). Sixty-eight percent of participants reported having at least one child. One half of the sample was employed with 31.9% reporting full time and 18.1% reporting part time employment. The remainder of the sample reported being unemployed (24.9%), on disability (18.3%), a homemaker (5.9%) or retired (0.2%).¹ The average duration from the target MVA to the time of assessment in this sample was 2.9 years ($Mdn = 1.0$; $SD = 5.7$). Approximately 50% ($n = 236$) of participants met full diagnostic criteria for PTSD based on diagnostic interviews (see 2.2.1.).

¹Three participants chose not to disclose their employment status.

2.2. Measures

2.2.1. Clinician Administered PTSD Scale (CAPS)—The CAPS (Blake et al., 1990) was used to assess PTSD diagnostic status as well as the severity of post-trauma symptoms over the past 30 days. CAPS items correspond to the 17 cardinal DSM-IV symptoms for PTSD and evaluate both the frequency and severity of symptoms, each rated on a 0 to 4 Likert scale. Total CAPS scores were calculated as the sum of frequency and intensity ratings for all 17 symptoms. Strong correlations between the CAPS and the Mississippi Scale for Combat-Related PTSD ($r = .70$ to $.91$; Keane, Caddell, & Taylor, 1988) and the Structured Clinical Interview for DSM-IV ($r = .89$; SCID-IV; First, Spitzer, Gibbon & Williams, 1995) provide evidence of convergent validity of the measure (Weathers, Keane, & Davidson, 2001). All interviews were conducted by trained graduate students supervised by the second author. Assessments were videotaped, and approximately 30% ($n = 145$) were randomly selected for independent review to establish inter-rater reliability. Diagnostic agreement between raters in this sample was excellent ($\kappa = .98$) as was the internal stability of the CAPS total score (coefficient alpha = $.94$).

2.2.2. PTSD Symptom Scale – Self Report (PSS-SR)—The PSS-SR (Foa, Riggs, Dancu, & Rothbaum, 1993) is a 17-item self report measure of PTSD based on *DSM-IV* criteria. Severity for each of the 17 symptoms of PTSD is rated on 0 to 3 point Likert scale. Total PSS-SR scores are calculated as the sum of items with total scores ranging from 0 to 51. Foa et al. (1993) have shown the PSS-SR to demonstrate good internal consistency ($\alpha = .91$), and the measure has been found to adequately converge with interviewer-based diagnoses of PTSD. Moderate correlations between the CAPS and PSS-SR were observed in the present sample ($r = .71$). Internal stability of the PSS-SR was excellent (coefficient alpha = $.94$).

2.2.3. Multidimensional Scale of Perceived Social Support (MSPSS)—The MSPSS (Zimet, Dahlem, Zimet, & Farley, 1988) is 12-item scale designed to assess perceptions of social support. Statements indicative of perceived support (e.g., *I can talk about my problems with my friends*; *There is a special person who is around when I am in need*) are rated on a 7-point Likert scale (1 - *very strongly disagree*; 7 - *very strongly agree*). Total MSPSS scores are calculated as the average of completed items with higher scores indicative of greater levels of perceived support. Evidence for the factorial validity of the MSPSS has been observed in both student and psychiatric samples (e.g., Dahlem, Zimet, & Walker, 1991; Clara, Cox, Enns, Murray, & Torgrud, 2003). The internal stability of the scale was excellent in this sample (coefficient alpha = $.92$).

2.2.4. Network Orientation Scale (NOS)—The NOS (Vaux, et al., 1986) is a 20-item measure designed to assess attitudes, beliefs, and expectations regarding the usefulness of social support networks during times of need. Statements reflecting positive and negative attitudes toward support utilization (e.g., *When a person gets upset they should talk it over with a friend*; *Its okay to ask favors of people*; *If you confide in other people, they will take advantage of you*) are rated on a 1 (*strongly agree*) to 4 (*strongly disagree*) point Likert scale. As recommended by Vaux et al. (1986), positive items were recoded and responses were summed such that higher scores reflect *negative* network orientation. Original validation research by Vaux et al. (1986) reported moderate correlations between NOS scores and the degree of perceived social support (average $r = -.47$). More modest associations were observed between NOS scores and the size of one's support network (average $r = -.16$). Subsequent use of the measure has demonstrated associations with attitudes towards seeking psychological assistance ($r = -.33$; Tata & Leong, 1994) and reluctance to confide in others ($r = .38$; Yoo et al., 2005). Internal stability of the NOS in this sample was good (coefficient alpha = $.84$).

2.2.5. Childhood Victimization—History of child physical abuse (CPA) and/or childhood sexual abuse (CSA) was assessed through one of two measures. The majority of participants ($n = 393$) completed the Life Events Checklist (LEC; Blake et al., 1990), a measure often used in conjunction with the CAPS. The Traumatic Life Events Questionnaire (TLEQ; Kubany et al., 2000) was introduced later in the research and was used in the remainder of the sample. Both measures contain a number of potentially traumatic events and ask participants to endorse those relevant to their personal experience. Participants endorsing a traumatic event in any area included on these measures were asked to provide a brief description of the event. Trauma consistent with CPA (e.g., family violence, physical assault, punishment resulting in serious injury) or CSA (e.g., inappropriate touching, fondling, or sexual experience during childhood) were conceptualized as childhood victimization. Victimization status was coded as a dichotomous variable in these analyses (0 = *no victimization*; 1 = *victimization*). Approximately 22% ($n = 102$) of the present sample reported events consistent with CPA and/or CSA.

2.2.6. Elapsed Time from MVA—Details regarding the target MVA were collected using a standard interview developed by Blanchard and Hickling (1997). Elapsed time from MVA was calculated as the number of months between the target MVA and the assessment.

2.3. Analytic Strategy

Analyses were conducted using Muthén and Muthén's (2004) MPlus software. A structural equation modeling (SEM) approach was chosen given several strengths over conventional ordinary least-squares (OLS) regression. Maximum likelihood estimation procedures utilized in SEM readily accommodate missing data and are regarded as a superior approach to missingness in most situations (Arbuckle, 1996). In addition, SEM allows the use of bootstrapping procedures which are recognized as the preferred method for testing indirect effects (Mackinnon, Lockwood, & Williams, 2004). Bootstrap procedures also accommodate the analysis of nonnormal data which violate the basic assumptions of OLS regression (West, Finch, & Curran, 1995; Yung & Bentler, 1996).

Although several authors have discussed methods for examining moderated indirect effects (e.g., Muller, Judd, & Yzerbyt, 2005; Preacher, Rucker, & Hayes, 2007), the present analyses were largely influenced by Edwards and Lambert's (2007) total-effects model (see Fig. 1). The basic form of this just-identified path model was identical across all analyses. Specifically, two sets of models were analyzed. The first set examined the indirect association between PTSD and social support through negative network orientation as well as the moderating influence of victimization status. This model was tested using CAPS and PSS-SR data respectively. The second set examined the indirect association between PTSD and social support through negative network orientation as well as the moderating influence of time since MVA. Again, both CAPS and PSS-SR data were examined. The hypothesized indirect association is represented through the combined effects of Paths A and B in the total-effects model (see Fig. 1). The hypothesized effects of the moderators (i.e., victimization and time since MVA respectively) are denoted by Path A_m . As evident in Figure 1, the total-effects model includes a number of additional exploratory pathways involving 1.) moderation of the association between network orientation and social support (Path B_m), 2.) moderation of the association between PTSD and social support (Path C_m), and 3.) direct effects of the moderator on network orientation and social support (Paths a & c). Although these pathways are not explicit among the hypothesized relationships, they represent theoretically plausible associations which provide a more complete assessment of the interrelationships between PTSD, network orientation, and social support.

3. Results

3.1. Data Screening and Preparation

Prior to analysis, all variables were screened to determine concordance with the assumptions of multivariate analysis. Descriptive statistics for all measures can be found in Table 1. Several cases evidenced missing data, largely because the NOS and MSPSS were included in the clinic's assessment battery after data collection was already underway (i.e., individuals assessed early in the course of data collection did not receive these measures). Because the preponderance of missingness in these data is due to the absence of these measures during initial collection as opposed to any systematic characteristic of participants (i.e., level of PTSD, network orientation, social support, victimization, or elapsed time from MVA), data loss is assumed to be missing completely at random (MCAR) and appropriate for analyses using SEM (Arbuckle, 1996; Kline, 2005). CAPS, PSS-SR, NOS, and MSPSS scores were found to be normally distributed (skew & kurtosis < 2) with no univariate (Z -score > 3.29) or multivariate (Mahalanobis distances $p < .001$) outliers (Tabachnick & Fidell, 2001). Elapsed time from MVA, in contrast, evidenced strong indices of skew (4.65) and kurtosis (26.39) further justifying bootstrapping procedures. Given evidence that the covariance matrix for these data were ill scaled (i.e., ratio of largest to smallest variance greater than 10), CAPS total, PSS-SR, NOS, victimization, and time since MVA were rescaled through multiplication by a constant (.1, .1, .5, 5, and .05 respectively; Kline, 2005). The resulting covariance matrix is shown in Table 1. Interaction terms were calculated through multiplication of the rescaled, centered variables.²

Confidence intervals for the hypothesized indirect effects were calculated using bias-corrected bootstrap procedures with 2000 resamples from the original data (MacKinnon et al., 2004). Because estimation of just-identified models perfectly reproduces the observed covariance matrix, no indices of model fit are presented in these analyses. Effect sizes for individual relationships, however, are provided by estimates of the standardized path coefficients. Coefficients within the ranges of .10, .30, and .50 are consistent with small, medium, and large effect sizes respectively (Kline, 2005).

3.2. Direct and indirect effects of PTSD, network orientation, and childhood victimization on social support - CAPS

Relationships observed in this model were consistent with the primary hypotheses (see Table 2). Specifically, CAPS severity was associated with greater negative network orientation controlling for victimization and its interaction with the CAPS (Path A = .499; $CI_{95} = .325, .668$; $p < .001$). Negative network orientation, in turn, demonstrated a strong association with lower MSPSS scores independent of CAPS, victimization, and the relevant interaction terms (Path B = $-.180$; $CI_{95} = -.215, -.138$; $p < .001$). As hypothesized, the product of these associations resulted in a significant indirect relationship between the CAPS and MSPSS through NOS (Path AB = $-.090$; $CI_{95} = -.125, -.055$; $p < .001$). These data suggest that PTSD severity is associated lower levels of social support by way of its relationship with negative network orientation, independent of the direct relationship between PTSD and social support.

No moderating effects of victimization were observed on any relationship in the model. Victimization evidenced a unique association with MSPSS, however, such that individuals reporting a history of CPA and/or CSA reported lower levels of social support relative to those with no victimization history (Path c = $-.080$; $CI_{95} = -.153, -.014$; $p = .023$). This model accounted for 12.8% of the variance in NOS scores and 29.9% of the variance in the MSPSS.

²The full variance-covariance matrix including the interaction terms is available from the first author upon request.

3.3. Direct and indirect effects of PTSD, network orientation, and childhood victimization on social support – PSS-SR

The pattern of relationships observed in the PSS-SR victimization model were identical, although larger in magnitude, to those observed with the CAPS (see Table 2). The increased effect sizes noted in this model are expected given the common assessment modality across the PSS-SR, NOS, and MSPSS. Specifically, PSS-SR severity was associated with greater negative network orientation (Path A = 1.202; $CI_{95} = .922, 1.476$; $p < .001$) which demonstrated a strong association with lower levels of social support (Path B = $-.165$; $CI_{95} = -.202, -.102$; $p < .001$). Consistent with the previous CAPS model, the resulting indirect relationship between PSS-SR and MSPSS through network orientation was significant (Path AB = $-.198$; $CI_{95} = -.263, -.133$; $p < .001$).

Victimization again demonstrated an inverse association with MSPSS scores independent of PSS-SR, NOS, and interaction terms (Path c = $-.075$; $CI_{95} = -.143, -.009$; $p = .029$). No moderating effects of victimization were observed on any relationship. This model accounted for 19.4% of the variance in NOS scores and 30.6% of the variance in the MSPSS. Significant pathways and standardized path coefficients for the CAPS and PSS-SR victimization models are shown in Figure 2.

3.4. Direct and indirect effects of PTSD, network orientation, and elapsed time from MVA on social support - CAPS

Results from the time since MVA analyses were similar to those of the victimization models (see Table 3). CAPS severity was associated with greater negative network orientation (Path A = $.563$; $CI_{95} = .386, .741$; $p < .001$) which was associated with lower MSPSS scores (Path B = $-.175$; $CI_{95} = -.212, -.130$; $p < .001$). Consistent with the primary hypotheses, the product of these relationships produced a significant indirect relationship between the CAPS and MSPSS through negative network orientation (Path AB = $-.098$; $CI_{95} = -.136, -.065$; $p < .001$).

Elapsed time from MVA demonstrated no interactive relationships with any variable in the model. An inverse association between time since MVA and NOS, however, suggests that negative network orientation increased as function of time in this sample (Path c = $.215$; $CI_{95} = .045, .359$; $p = .008$). This model accounted for 14.6% of the variance in NOS scores and 28.4% of the variance in the MSPSS.

3.5. Direct and indirect effects of PTSD, network orientation, and elapsed time from MVA on social support – PSS-SR

Analyses of PSS-SR scores in the time since trauma model again provided support for the hypothesized indirect effect (Path AB = $-.210$; $CI_{95} = -.275, -.143$; $p < .001$) owing to significant relationships between the PSS-SR and negative network orientation (Path A = 1.296 ; $CI_{95} = 1.003, 1.589$; $p < .001$) and between negative network orientation and the MSPSS (Path B = $-.162$; $CI_{95} = -.200, -.119$; $p < .001$). Elapsed time from MVA evidenced no direct or interactive relationship with any of the observed variables. This model accounted for 21.3% of the variance in NOS scores and 29.4% of the variance in the MSPSS. Significant pathways and standardized path coefficients for the CAPS and PSS-SR time since MVA models are shown in Figure 3.

4. Discussion

The aim of the current investigation was to examine the role of network orientation in explicating the association between PTSD and attenuated social support. The moderating effects of childhood victimization and time since MVA on this relationship also were explored given their theoretical relevance to network orientation. As hypothesized, PTSD severity was

associated with greater negative network orientation which, in turn, was associated with lower levels of social support. The combined effect of these associations resulted in a significant indirect relationship between PTSD and social support through negative network orientation. This pattern of relationships was consistent across interview and self-report assessments. PTSD failed to demonstrate a relationship with social support in any model after controlling for network orientation. With respect to the potential moderators, participants reporting childhood victimization evidenced lower social support than those without in both the CAPS and PSS-SR models. Elapsed time from MVA, in contrast, was associated with greater negative network orientation within the CAPS model only. Despite these direct effects, neither victimization nor time since MVA was observed to moderate the overall magnitude of the indirect relationship between PTSD and social support through negative network orientation.

The results of the present study support a variant of the erosion model wherein negative network orientation serves as an intervening variable in the relationship between PTSD and social support. The cross-sectional nature of the design clearly precludes inferences regarding the causal structure of the observed associations; however, this report suggests that attitudes regarding the utilization of support resources may be an important factor in refining existing models of post-trauma functioning. For example, symptoms associated with trauma exposure (e.g., interpersonal detachment, irritability) have been proposed to contribute *directly* to the erosion of social support (e.g., King et al., 2006). The present research, in contrast, failed to detect a direct relationship between PTSD symptomology and social support after controlling for the indirect association through negative network orientation. Although preliminary, these data stress the importance of considering both the direct and indirect effects of PTSD on posttrauma outcomes.

The moderate to large effects observed in these analyses support the relevance of network orientation in explicating the relationship between PTSD and social support. It should be noted, however, that the present models accounted only for a modest percentage of variance in network orientation. These results suggest that a number of additional factors may be important in understanding the role of network orientation following trauma. For example, posttraumatic cognitions (negative attributions regarding the self, others, and the world) are a core component in many models of PTSD (Ehlers & Clark, 2000; Resick & Schnicke, 1992). These dysfunctional cognitions are known to be elevated in survivors of serious trauma (e.g., Beck, et al., 2004; Foa, Ehlers, Clark, Tolin, & Orsillo, 1999) and may contribute to negative network orientation independent of the clinical symptoms of PTSD. Changes in the structure and availability of support networks also may impact post-trauma network orientation given evidence of their influence on psychosocial functioning following disaster (e.g., Kaniasty & Norris, 1993; Norris & Kaniasty, 1996). Consideration of these factors promises to refine continued investigation of the dynamic between PTSD and interpersonal processes.

The erosion model served as the primary framework for conceptualization of the observed indirect effects. Framing our research questions within this model was based on a number of considerations. Existing research provides initial support for the validity of the erosion hypothesis (King et al., 2006). More importantly, inclusion of network orientation as an intervening variable within this framework provided a set of theoretically plausible and meaningful relationships. A number of additional models (e.g., stress-buffering model) were considered in the design of this research, but no alternative configuration of the present data (e.g., social support influencing the severity of PTSD by way of negative network orientation) provided the conceptual clarity of the chosen model.

Interpretation of these data should be made within the context of the study's strengths and limitations. All indicators included in these analyses evidenced excellent reliability, and the use of multiple measures of PTSD (interview vs. self-report) provide evidence for the stability

of the observed relationships. Furthermore, the sample available for these analyses provided ample power to test the hypothesized relationships. Finally, the use of SEM and resampling procedures address many of the methodological limitations which typically plague conventional approaches to these analyses.

These strengths of this research, however, are contrasted by a number of limitations. Although early work by Tolsdorf (1976) and others have clearly explicated the conceptual framework underlying network orientation, psychometric research examining the formal measurement of this construct has been limited (e.g., Vaux, 1985; Vaux et al., 1986). Explication of the factorial and discriminant validity of the NOS promises to strengthen future research in this area. It also is important to emphasize that the cross-sectional design of the research precludes inferences regarding the causal nature of the observed relationships. Construction of the present models was informed by existing theory and research, but causal relationships cannot and should not be inferred. Concerns also may be raised regarding generalizability to alternative trauma samples. Participants included in these analyses were largely Caucasian and female, all of whom experienced a similar mode of trauma. Effect sizes for the bivariate association between PTSD and social support were comparable to those observed in previous studies (Brewin et al., 2000; Ozer et al., 2003), providing some evidence in support of their generalizability. However, replication of these results in more diverse samples is needed to strengthen conclusions drawn from this research.

The present research advances the existing literature by examining a specific set of dysfunctional attitudes known to be associated with attenuated social support. These results contribute to existing conceptual models and provide an empirical basis for the inclusion of network orientation in future investigations of posttrauma functioning. These data also hold translational implications for the continuing development of post-trauma interventions. Many factors contributing to reductions in post-trauma support (e.g., loss of friends or family, reduced availability of support resources) may be beyond direct intervention through psychosocial treatment. Attitudes associated with negative network orientation, in contrast, seem comparable to dysfunctional beliefs commonly addressed using cognitive-behavioral interventions (e.g., Beck, 1964; Barlow, Craske, Cerny, & Klosko, 1989; Heimberg et al., 1990). Modification of dysfunctional attitudes regarding the utilization of support resources may ensure that trauma survivors are taking full advantage of the support networks available to them.

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Figure 1.

Total-effects model for the moderated indirect effect of PTSD on social support through network orientation; dNO and dSS represent disturbance terms for network orientation and social support, respectively

Figure 2.

Simplified model of associations among PTSD, network orientation, and childhood victimization on social support; Paths noted with a broken line are not significant at $p < .05$; Standardized path coefficients for the CAPS are presented above, those for the PSS-SR are presented below (in parentheses); covariances and disturbance terms not shown.

Figure 3.

Simplified model of associations among PTSD, network orientation, and elapsed time from MVA on social support; Paths noted with a broken line are not significant at $p < .05$; Standardized path coefficients for the CAPS are presented above, those for the PSS-SR are presented below (in parentheses); [†] Path not significant at $p < .05$ in the PSS-SR model; Covariances and disturbance terms not shown.

Table 1
Correlations, variance-covariance matrix, and descriptive statistics for primary variables^a

	CAPS	PS-SSR	NOS	MSPSS	Victim	Time	<i>M^b</i>	<i>SD^b</i>	<i>n</i>
CAPS	6.578	2.425	2.672	-.448	.582	-1.971	45.65	25.65	458
PSS-SR	.712**	1.776	1.971	-.486	.317	-.780	22.46	13.33	400
NOS	.315**	.421**	13.508	-2.454	.598	.406	46.15	7.35	302
MSPSS	-.153**	-.300**	-.523**	1.624	-.459	-.145	5.20	1.27	302
Victim	.109*	.116*	.077	-.170*	4.337	-.095	.22	.42	458
Time	-.224**	-.170**	.031	-.036	-.013	11.783	35.17	68.65	458

Note: CAPS = Clinician-Administered PTSD Scale total; PSS-SR = PTSD Symptom Scale - Self Report; NOS = Network Orientation Scale; MSPSS = Multidimensional Scale of Perceived Social Support; Victim = history of child physical and/or sexual abuse; Time = elapsed time from MVA (months)

^aDiagonal contains variances (in boldface type), upper triangle contains covariances, lower triangle contains correlations, all calculated following adjustment for relative variances

^bValues prior to adjustment for relative variance

* $p < .05$;

** $p < .001$

Table 2
Path coefficients for direct and indirect effects of PTSD, network orientation, and childhood victimization on social support

DV	IV	Std. Coeff	Coeff.	Std. Error	t - value	p
NOS	CAPS (A)	.344	.499	.089	5.62	<.001
	Victim (a)	.047	.084	.099	.85	ns
	VxCAPS (A _m)	.059	.042	.043	.97	ns
MSPSS	CAPS (C)	.020	.010	.029	.33	ns
	Victim (c)	-.131	-.080	.035	-2.28	.023
	VxCAPS (C _m)	-.040	-.010	.019	-.52	ns
Indirect Effect (AB)	NOS (B)	-.523	-.180	.019	-9.24	<.001
	VxNOS (B _m)	.072	.011	.011	1.01	ns
		-.180	-.090	.018	-4.92	<.001
NOS	PSS-SR (A)	.432	1.202	.142	8.46	<.001
	Victim (a)	.040	.071	.091	.78	ns
	VxPSSSR (A _m)	.019	.024	.062	.39	ns
MSPSS	PSS-SR (C)	-.091	-.087	.059	-1.48	ns
	Victim (c)	-.123	-.075	.034	-2.20	.029
	VxPSSSR (C _m)	-.031	-.014	.030	-.01	ns
Indirect Effect (AB)	NOS (B)	-.478	-.165	.021	-7.95	<.001
	VxNOS (B _m)	.073	.012	.012	1.18	ns
		-.207	-.198	.034	-5.85	<.001

Note: CAPS = Clinician-Administered PTSD Scale total; PSS-SR = PTSD Symptoms Scale – Self Report; NOS = Network Orientation Scale; MSPSS = Multidimensional Scale of Perceived Social Support; Victim = history of child physical and/or sexual abuse; VxCAPS = victimization by CAPS interaction; VxPSSSR = victimization by PSS-SR interaction; VxNOS = victimization by NOS interaction; Std. Coeff = standardized path coefficient; Coeff = unstandardized path coefficient

Table 3
Path coefficients for direct and indirect effects of PTSD, network orientation, and elapsed time from MVA on social support

DV	IV	Std. Coeff	Coeff.	Std. Error	t - value	p
NOS	CAPS (A)	.387	.563	.092	6.14	<.001
	Time (a)	.198	.215	.080	2.68	.008
	TxCAPS (A _m)	.095	.035	.024	1.43	ns
MSPSS	CAPS (C)	-.011	-.005	.032	-.17	ns
	Time (c)	-.081	-.030	.030	-1.00	ns
	TxCAPS (C _m)	-.076	-.010	.012	-.82	ns
Indirect Effect (AB)	NOS (B)	-.510	-.175	.020	-8.75	<.001
	TxNOS (B _m)	.100	.013	.009	.01	ns
		-.197	-.098	.019	-5.25	<.001
NOS	PSS-SR (A)	.464	1.296	.148	8.73	<.001
	Time (a)	.148	.160	.091	1.75	ns
	TxPSSSR (A _m)	.044	.031	.056	.56	ns
MSPSS	PSS-SR (C)	-.114	-.109	.062	-1.77	ns
	Time (c)	-.057	-.021	.028	-.75	ns
	TxPSSSR (C _m)	-.005	-.001	.023	.00	ns
Indirect Effect (AB)	NOS (B)	-.472	-.162	.020	-7.95	<.001
	TxNOS (B _m)	.072	.009	.008	1.11	ns
		-.219	-.210	.034	-6.13	<.001

Note: CAPS = Clinician-Administered PTSD Scale total; PSS-SR = PTSD Symptoms Scale – Self Report; NOS = Network Orientation Scale; MSPSS = Multidimensional Scale of Perceived Social Support; Time = elapsed time from MVA; TxCAPS = Time by CAPS interaction; TxPSSSR = Time by PSS-SR interaction; TxNOS = Time by NOS interaction; Std. Coeff = standardized path coefficient; Coeff = unstandardized path coefficient