

Personality, Coping, Chronic Stress, Social Support and PTSD Symptoms Among Adult Burn Survivors

A Path Analysis

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This paper presents a longitudinal study of the relationship between personality, coping, chronic stress, social support and posttraumatic stress disorder (PTSD). A hypothesized model of the relationship between the predictor variables and PTSD symptoms was proposed. Path analyses was completed to test the model. One hundred fifty-eight adult burn survivors completed questionnaires measuring each of the variables in the hospital. Of those 124 and 94 completed the PTSD measure at 1 month and 6 months postdischarge, respectively. The hypothesized model fit the data at each time point with slight variations. The model accounted for 46 and 29% of the variance of PTSD symptoms at hospitalization and 1 month. Neuroticism was the most important personality dimension in predicting PTSD. Avoidant Coping and Social Support mediated a high percentage of the relationship between Neuroticism and PTSD. The best predictor of PTSD symptoms at 1 and 6 months was PTSD symptoms at hospitalization. (*J Burn Care Rehabil* 2003;24:63–72)

Posttraumatic stress disorder (PTSD) symptoms following a severe burn injury are common.¹ Symptoms include reexperiencing of the traumatic event in thoughts and dreams, avoiding or suppressing reminders of the event, emotional numbing and dissociating, and hyperarousal and anxiety.² For most burn survivors, these symptoms dissipate over time but for a sizable minority—between 5 and 25%—the symptoms become chronic.^{1,3,4}

In other trauma populations (eg, combat, interpersonal violence, natural disasters, car accidents), a sizable minority also develops chronic PTSD.^{5–8} The repeated observation that trauma exposure does not necessarily produce PTSD has begged the question—what distinguishes people who develop PTSD? A better understanding of the etiology of PTSD could help us develop better treatment and prevention pro-

grams. Recent models of PTSD suggest that adjustment to trauma is a dynamic process influenced by pretrauma factors (low socioeconomic status, family instability, early trauma history), resilience-recovery variables (personality, coping strategies, social support and additional stressful life events) and traumatic event characteristics (intensity and duration of exposure, perceived threat, exposure to atrocities or abusive behavior, injury).^{5,9–16}

The current study is a longitudinal study investigating the relationship between factors hypothesized to influence a trauma survivor's ability to emotionally resist or recover from the effects of trauma.^{5,7} These factors include personality, coping strategies, social support and chronic stress. In a recent review article on the relationship between personality, coping and adjustment to traumatic stress, Skodol¹³ stated that previous research has been limited by the following methodological issues: 1) Most studies have been retrospective. 2) They ignore preexisting factors. 3) They let the respondent identify the most significant stressor they have experienced thus introducing heterogeneity of the stressor itself. 4) Participants are often college students. 5) The studies are cross-sectional rather than longitudinal. 6) Most studies do not assess personality disposition and situational coping independently. 7) "Studies have limited personality dimensions to neuroticism or use constructs

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such as hardiness, not clearly related to prevailing personality models.” 8) Studies on coping do not consider other potentially mediating variables such as social support. 9) Studies have not looked at characteristics of the stressful situation that make some coping strategies better. The current study addresses some of these limitations.¹³

VARIABLES IN THE MODEL AND A SUMMARY OF RELEVANT RESEARCH

Personality

“Personality denotes a complex organization of systematically interrelated trait dispositions.”¹⁷ Though there are many trait models of personality, over the last 15 years consensus in the personality literature has coalesced around the 5-factor model of personality.^{14,18} The “big five” personality factors include Neuroticism (N), Extraversion (E), Openness (O), Agreeableness (A), and Conscientiousness (C). Neuroticism is “the general tendency to experience negative affects such as fear, sadness, embarrassment, anger, guilt, and disgust.”¹⁸ In addition, people “high in N are prone to have irrational ideas, to be less able to control their impulses, and to cope more poorly than others with stress.”¹⁸ Extraversion is a measure of sociability and energy. People high in E are “assertive, active and talkative.” People low in E are not necessarily socially anxious or shy. Rather, they are independent, prefer to be alone, and “are not given to the exuberant high spirits of extraverts.”¹⁸ People high in Openness have the following characteristics: active imagination, aesthetic sensitivity, attentiveness to inner feelings, preference for variety, intellectual curiosity, and independence of judgment. Low O suggests a person is “conventional in behavior and conservative in outlook.”¹⁸ Agreeableness is a measure of the interpersonal characteristics of altruism, empathy and trust. Conscientiousness is a measure of the “will to achieve.”¹⁸ It refers to the tendency to plan, organize and follow through on tasks.

In previous research, high N, and associated constructs such as hardiness, has consistently been associated with depression and anxiety disorders.^{5,9,11–14,19,20} A number of researchers have hypothesized that the relationship between N and distress disorders is mediated by a more severe affective reaction to stress¹⁴ due to differences in hypothalamic-pituitary-adrenal axis regulation²¹ and a disproportionate use of avoidant coping strategies.²²

The hypothesized relationship between E and PTSD has proven to be less consistent.^{11–14,17} Among a sample of burn survivors, low E was associ-

ated with higher PTSD symptoms.²³ However, other researchers have found no relationship between E and PTSD but have found a relationship between E and trauma exposure.¹² Thus, E may be related to PTSD in contradictory ways. People who are high in E tend to be more impulsive and adventurous and thus might be more likely to be exposed to trauma. On the other hand, people high in E would be expected to better engage social support following trauma exposure, which in turn would reduce symptoms.

There has been little work exploring the relationship between agreeableness, conscientiousness and openness and PTSD.^{11–14} “A” might have an indirect effect on PTSD through social support. People with high C would likely ruminate more about the trauma and thus C might have a direct effect on PTSD. On the other hand, high C people would be more likely to engage in approach coping strategies likely reducing PTSD symptoms. Last, high O suggests a higher level of cognitive flexibility, and thus, these people might better be able to positively reframe the traumatic event.

Coping Strategies

“Coping refers to behavior that protects people from being psychologically harmed by adverse experiences. This protective function can take three forms. A person can 1) modify or change problematic conditions, 2) control the meaning of an experience to neutralize its problematic character, or 3) manage the emotional consequences of the experience.”²⁴ Many types of coping strategies have been proposed and observed. A number of researchers have suggested that coping strategies can be broadly classified as either approach or avoidance coping.²⁵ Approach coping is “directly resolving or conquering the stressor.” Avoidance coping is “attempting to either avoid thinking about the stressor or control the associated affect.”²⁵

In general, approach based coping has been considered more adaptive and associated with less distress.^{7,13,22,25} However, a number of studies have suggested that in uncontrollable situations certain avoidance strategies are more effective for managing distress. For example, among inter-city children behavioral avoidance mediated the relationship between violence exposure and PTSD symptoms. Behavioral avoidance (withdrawal, do nothing) was associated with lower arousal symptoms.²⁶ Moreover, recent studies suggests that an ambivalent coping style combining emotion approach with emotion avoidance is associated with more severe posttraumatic distress,¹⁶ body image dissatisfaction²⁷ and symptoms of depression²⁸ among burn survivors.

Social Support

High social support has been associated with a variety of positive mental and physical health outcomes including lessening the effects of trauma exposure.²⁹ There are a number of types of support including emotional support, practical support and negative responses. There is evidence that a sense of belonging or connectedness is the most important variable in mediating stress.^{29–31}

Chronic Stress

Numerous studies have found that ongoing chronic stress and additional traumatic events are associated with increased PTSD symptoms.^{5,9,32}

THE HYPOTHESIZED MODEL

The hypothesized model is presented in Figure 1. We postulated that N would have a direct effect on PTSD and an indirect effect mediated by high avoidant coping and low social support. We hypothesized E would have no direct effect on PTSD yet an indirect effect mediated by high active coping and high social support. Avoidant coping would be positively associated

with PTSD symptoms. Active coping would be negatively correlated with PTSD symptoms. Chronic stress was hypothesized to have a direct effect on PTSD independent of the other predictor variables. We expected N to correlate with both E and chronic stress. We did not expect E and chronic stress to correlate. We tested the ability of the model to predict PTSD symptoms at three time points—during hospitalization, 1 month postdischarge, and 6 months postdischarge.

Since we did not have a large enough sample size to test the five personality factors simultaneously, we substituted O, A, and C into the model respectively in place of E. We hypothesized O would be unrelated to PTSD. We postulated that A would have no direct effect on PTSD and an indirect effect mediated by social support. We tested the possibility that C would have a direct effect on PTSD and an indirect effect mediated by active coping.

METHOD

Participants

Participants included 158 adult burn survivors (118 men and 40 women) requiring hospitalization in the Baltimore Regional Burn Center. The mean age was 41.8 (SD = 15.4). The sample was 65% European American, 33% African American, and 2% other. The distribution of educational attainment of the sample was as follows: 21% did not complete high school, 49% graduated from high school or had a GED, 20% had an associate or technical degree, and 11% had a college degree or greater. The total body surface area (TBSA) ranged from 1% to 85% with an average of 15.7% (SD = 16.4). This is close to the national average for TBSA from regional burn centers. The average TBSA full-thickness burn (third degree burn) was 6.9% (SD = 10.1). Forty-six percent of the sample was married or living with a significant other; 54% of the sample was single.

At 1 month and 6 months, we readministered the Davidson Trauma Scale (DTS)^{33,34} to participants. One hundred twenty-four and 94 participants completed the DTS at each time point, respectively. Participants retained in the study at 1 month did not significantly differ from those who dropped out on the demographic variables described above or PTSD symptoms at discharge. Those participants retained at 6 months did differ significantly on TBSA ($F = 4.2, P > .05$). Participants retained in the study tended to have a larger TBSA (mean TBSA: Retained Group = 17.9 (SD = 18.4); Dropout Group = 12.5 (SD = 12.1)). This difference is likely due to the fact that

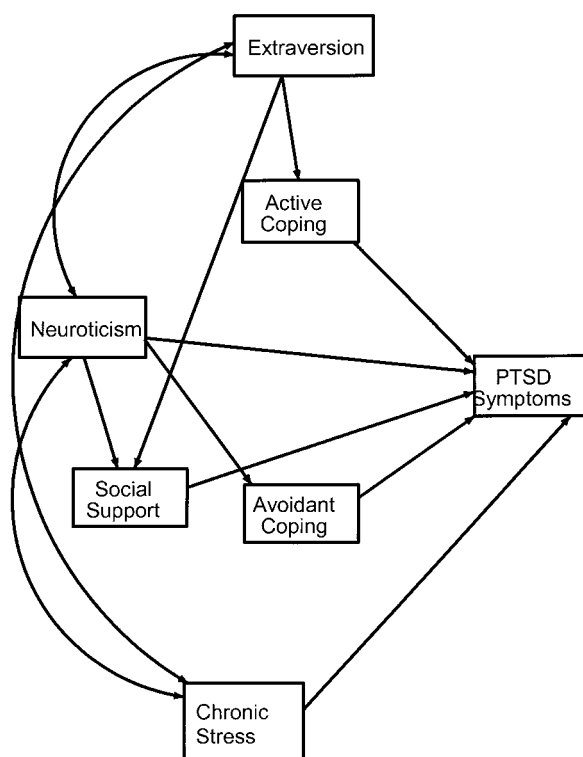


Figure 1. Hypothesized model of the relationship between resilience/recover variables and posttraumatic stress disorder (PTSD) symptoms.

people with higher TBSA return to the outpatient clinic for a longer period. Thus, it is easier to stay in contact with them.

Procedure

While hospitalized, one of the investigators or the study coordinator gave a complete description of the longitudinal study to potential participants and asked them to partake in the study. Enrolled participants provided informed, written consent according to procedures approved by the Institutional Review Board. A trained research coordinator administered the questionnaires either in person or via telephone. We used a variety of strategies to retain participants in the study including repeated mailings, phone contact and personal contact during routine burn clinic follow-ups. We administered all predictor questionnaires and the acute PTSD measure during hospitalization. Participants completed a PTSD instrument again at 1 and 6 months postdischarge.

Measures

The NEO Five-Factor Inventory (NEO-FFI). The NEO-FFI is a 60-item measure of the five-factor model of personality.¹⁸ The five personality factors include Neuroticism (N), Extraversion (E), Openness (O), Agreeableness (A), and Conscientiousness (C). It has good psychometric properties and has been used in numerous studies.

Brief COPE. The Brief COPE (the short version of the COPE) measures a variety of coping behaviors.^{35,36} It has demonstrated good psychometric properties. In the current study, the 12 coping behaviors assessed include: self-distraction, active coping, denial, substance use, use of emotional support, behavioral disengagement, venting, positive reframing, planning, humor, acceptance, and religion. Participants endorse how often they have been using the coping strategy described by each item on a 4-point Likert scale ranging from "I haven't been doing this at all" to "I've been doing this a lot." For example, the item "I've been looking for something good in what is happening" is an item on the positive reframing scale.

In the current study, we combined a subset of the various coping strategies to create measures of two general coping strategies—approach and avoidant coping—following the author's recommendation to derive general coping styles from a second-order factor analysis of the Brief COPE (see RESULTS).

Interpersonal Support Evaluation List (ISEL). The ISEL is a 40-item measure of social support. It consists of four 10-item subscales—tangible support, appraisal, self-esteem and belonging.^{37,38} In this

study, we used the belonging subscale, which measures "the perceived availability of others to do things with."³⁷ Participants marked the items as either being "true" or "false" for them. The ISEL has been widely used and consistently shown a stress-buffering effect.²⁹

Chronic Stress Scale (CSS). The CSS is a 27-item, 7-dimension scale.³⁹ The dimensions are marital stress, parental stress, filial stress, financial stress, occupational stress, ecological stress, and physical stress. On each item, participants indicate how often they experienced the particular stressor in the last six months on a five-point scale ranging from "never" (0) to "very often" (4). The overall alpha for the total scale was .83 among a sample of 1000 adults.

Stanford Acute Stress Reaction Questionnaire (SASRQ). The SASRQ is a 30-item instrument measuring the symptoms of acute stress disorder (ASD).⁴⁰ ASD is the DSM-IV diagnosis for acute posttraumatic stress within one month of the trauma exposure.² We used the SASRQ to measure acute PTSD symptoms during hospitalization. Participants rated the degree to which they have experienced symptoms on a six-point Likert scale ranging from "not experienced" to "very often experienced." We modified the wording of the measure slightly to distinguish the burn trauma from previously experienced traumatic events. For example, one item read, "I had repeated, distressing dreams of my burn injury." The SASRQ has shown good reliability and convergent, discriminant, and construct validity in a variety of trauma samples.

Davidson Trauma Scale (DTS). The DTS^{30,31} is a 17-item instrument in which patients rate both the frequency and severity of all the posttraumatic stress symptoms listed in the Diagnostic and Statistical Manual of Mental Disorders.² Patients make their ratings on a five-alternative forced choice format: frequency ranging from "not at all" (0) to "everyday" (4) and severity ranging from "not at all distressing" (0) to "extremely distressing" (4). As an outcome measure, we used the DTS total score summing the frequency and severity scores. We administered the DTS at 1 and 6 months postdischarge. The DTS has proven to be both a reliable and valid measure of PTSD symptoms among survivors of childhood sexual abuse,³⁴ rape, combat and natural disaster survivors.³³

Data Analysis

Structural Equation Modeling (SEM) is a versatile statistical technique that allows a researcher to specify a model of the relationship between the variables in his study and statistically test the fit of the model to

the data.^{41–43} In this study, we did a path analysis, which is a specific application of SEM with observed variables. (SEM can also be used with latent variables—latent variables are variables that are inferred from the relationship between a group of observed variables similar to factors in factor analysis.) SEM is based on the analysis of covariance structures.

The SEM analysis can be conceptualized as a multistep procedure.^{41–43} First, we specified the model to be tested and determined that it was *identified*; that is, it was theoretically possible “to derive a unique estimate of every model parameter.”⁴¹ Second, we did a preliminary screening of the data to rule out multicollinearity (redundancy between measurements) and to assure the data were normally distributed. Third, we evaluated model fit “to determine how adequately the model accounts for the data.”⁴¹ Most often, a researcher’s initial model does not fit the data. Consequently, the model is respecified and the revised model’s “goodness of fit” with the data is tested again. We used *Modification Indexes* to guide respecification. Modification indexes statistically test paths that were not originally hypothesized by the model to determine if they might improve the overall fit of the model.⁴² Finally, once the best fitting model was determined, each individual path in the model was tested for significance using factor loading parameter estimates.

In SEM, it is standard to use multiple criteria for evaluating model fit. There are numerous goodness-of-fit indices in the literature. Based on recommendations by Byrne (2001),⁴² Hu and Bentler (1998),⁴⁴ Kline (1998)⁴¹ and MacCallum and Austin (2000),⁴⁵ we chose the following fit indexes: Pearson chi-squared divided by the degrees of freedom (χ^2/df), comparative fit index (CFI), goodness-of-fit index (GFI), Tucker-Lewis Index (TLI), root-mean-square error of approximation (RMSEA), Akaike’s information criterion (AIC), and expected cross-validation index (ECVI). Standards for good fit are included in the table of fit indexes in the results section. The statistical rational underpinning each fit index is beyond the scope of this paper. Interested readers can consult the previously mentioned references.^{41–45}

RESULTS

Preliminary Analyses

Data Screening. There were 11 data points missing in the data set. No more than two data points were missing on any particular item. Missing data were replaced using mean substitutions. There was no evidence of multicollinearity—correlations between

variables were modest and all multiple correlations (R^2) were well below .85 cutoff recommended by Kline (p78).⁴¹ On one variable, avoidant coping, six participants scores were between 3 and 3.7 standard deviations greater than the mean. This is likely due to the fact that the variable distribution is positively skewed (skew = 1.35) thus making high scores a relatively greater distance from the mean. Since the variable was skewed, these scores were not considered extreme and these participants’ data were included in the analysis.

Social support also had a skewed distribution (skewness = -2.0, kurtosis = 3.9). However, the distribution was within the accepted range of univariate normal distributions based on the cutoff guidelines recommended by Kline (skew < 3 and kurtosis < 10).⁴¹ To assess for multivariate outliers, squared Mahalanobis distances were compared to the critical value χ^2 (11)—11 is the number of variables in the model—at the .001 level (31.26). No cases differed significantly from the others at this level of significance.

COPE Factor Analysis. We excluded the coping strategy “substance use” from the analysis because few people endorsed this item. Consequently, the scale did not have a normal distribution (skewness = 4.1; kurtosis = 17.4). An exploratory factor analysis with the least square extraction method and a varimax rotation yielded two factors (Table 1). The first factor, “approach coping” consisted of the coping strategies active coping, positive reframing, and planning. “Avoidant coping” consisted of denial, behavioral disengagement, venting, and acceptance (inverse relation). Acceptance was reverse coded before adding it to the composite score. The second order factor scores were calculated by summing the scores of first-order factors.

Table 1. Rotated (varimax) factor loadings of Brief COPE

I-Order Factors	Factor 1	Factor 2
Self-Distraction	.394	.274
Active Coping	.509*	.055
Denial	.128	.673*
Emotional Support	.388	-.11
Behavioral Disengagement	-.089	.773*
Venting	.084	.49*
Positive Reframing	.661*	.117
Planning	.707*	.128
Humor	.302	-.025
Acceptance	.365	-.556*
Religion	.254	.086

* Values > .45.

Primary Analyses

Testing the Hypothesized Model for Acute PTSD During Hospitalization. The results of the model-fitting procedures are summarized in Table 2. The initial model yielded an adequate fit to the data. The Modification Indexes indicated that incorporating two causal pathways into the model would significantly improve the model fit. Causal pathways from avoidant coping to social support and chronic stress to active coping were added, respectively. The re-specified model significantly improved model fit as indicated by the significant $\Delta\chi^2$ (Table 2). Finally, we evaluated the critical ratio (CR) of each regression weight. All regression weights were significant except two, which approached significance. The critical ratio for chronic stress regressed onto PTSD was 1.61 ($P > .11$). The critical ratio for social support regressed onto PTSD was -1.57 ($P > .12$). Active coping, which we expected to be negatively related to PTSD, was positively related to PTSD. The squared multiple correlation for acute PTSD equaled .46. Thus, the model accounted for 46% of the variance of PTSD. The final model and standardized regression weights are represented in Figure 2. Kline⁴¹ outlined a rough guide for interpreting standardized path coefficients: less than .10 is a "small" effect; around .30 is a "medium" effect; 50 or greater is a "large effect."

Predicting PTSD Symptoms at 1 Month. The model predicting PTSD at 1 month fit the data well (Table 3). There were no additional significant paths according to the Modification Indexes. All pathways were significant except the direct effect of neuroticism on PTSD at 1 month (Figure 3). The square multiple correlation of PTSD equaled .29.

Predicting PTSD at 6 Months. The model continued to fit the data adequately. However, at 6 months, the only pathway to PTSD at 6 months that reached significance was active coping. The pathways from neuroticism ($CR = 1.47$, $P < .14$), avoidant coping ($CR = 1.51$, $P < .13$), and chronic stress ($CR = 1.68$, $P < .09$) approached significance. Likely these paths would have been significant if the sample size were larger. Social support was not significantly

related to PTSD at 6 months ($CR = .31$, $P < .76$). Though it appeared we lacked the power to validate the model at 6 months, the pattern of relationships was similar to the previous two time points. For the sake of parsimony in data presentation, we did not present the model fitting indexes and path diagram at 6 months.

Assessing Direct, Indirect and Total Effects. Effects can be decomposed into direct, indirect, and total effects. Direct effects are not mediated by other variables. Indirect effects are mediated by other variables. Total effect equals the sum of direct and indirect effect. The decomposition of effects at hospitalization and 1 month postdischarge is presented in Table 4. Much of the effect of neuroticism was indirect at both time points. Though related to other variables in the model (social support and active coping), extraversion had little influence on PTSD.

Testing Openness, Agreeableness and Conscientiousness in the Model. We substituted O, A and C into the model for E at both discharge, 1 month and 6 months. For O and C we tested a direct effect on PTSD and a mediated effect through Active Coping. For A we tested a direct effect on PTSD and a mediated effect through social support. None of the variables had a significant direct effect at either time point. None of the variables had a significant total effect at either time point.

Posthoc Analyses: Predicting PTSD at 1 and 6 Months Taking into Account PTSD Symptoms During Hospitalization

In order to determine if the personality, coping, chronic stress or social support accounted for any variance in chronic PTSD symptoms when controlling for PTSD symptoms at baseline, we conducted a series of multiple regressions. Predicting PTSD symptoms at 1 month, only PTSD symptoms at baseline entered the equation ($r^2 = .419$, $P > .001$). Predicting PTSD symptoms at 6 months, PTSD at baseline ($r^2 = .363$, $P > .001$) and active coping ($r^2 = .033$, $P > .05$) were significant.

Table 2. Test statistics for the hypothesized model at hospitalization

Model	χ^2	df	P	χ^2/df	$\Delta\chi^2$	CFI	GFI	TLI	RMSEA	AIC	ECVI
Criteria			$P > .05$	< 3.0		$> .95$	$> .9$	$> .95$	$< .08$	Low	Low
Initial	25.6	9	.002	2.85		.942	.957	.864	.108	63.6	.405
Added 2 pathways	8.3	7	.305	1.19	17.3*	.995	.985	.986	.035	50.3	.321

CFI, comparative fit index; GFI, goodness-of-fit index; TLI, Tucker-Lewis Index; RMSEA, root-mean-square error of approximation; AIC, Akaike's information criterion; ECVI, expected cross-validation index.

* $P > .01$ based on critical values of χ^2 with 2 degrees of freedom.

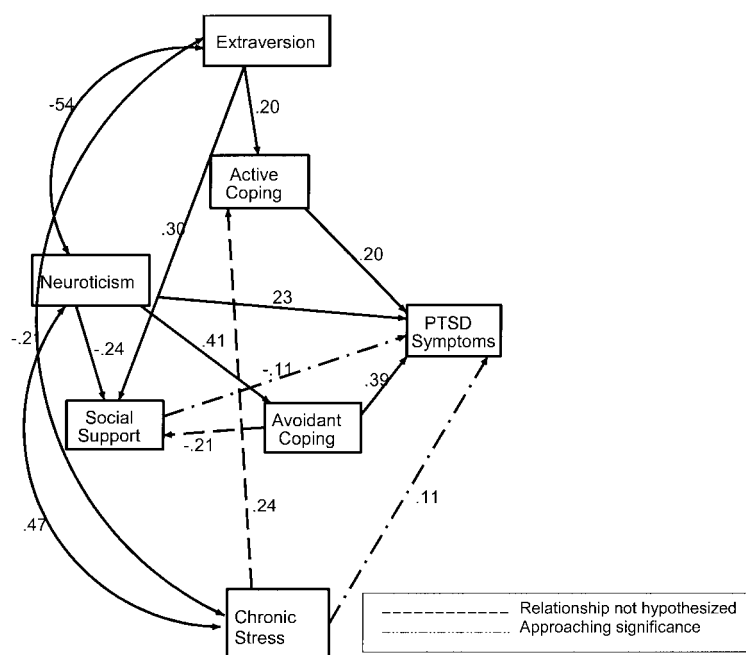


Figure 2. Path Analysis for model with standardized estimates at hospitalization. The estimates of the unanalyzed associations (curved lines) are the observed correlations. The estimates of beta weights (straight lines) are standardized path coefficients. For example, a standardized path coefficient of .39 for the direct effect avoidant coping on posttraumatic stress disorder (PTSD) symptoms means that PTSD is expected to increase by .39 SDs if avoidant coping changes by 1.0 SD controlling for the other variables in the model.

Table 3. Model fitting indexes for posttraumatic stress disorder at 1 month

Model	χ^2	df	P	χ^2/df	$\Delta\chi^2$	CFI	GFI	TLI	RMSEA	AIC	ECVI
Criteria			$P > .05$	< 3.0		$> .95$	$> .9$	$> .95$	$< .08$	Low	Low
Initial	11.6	7	.114	1.66		.98	.97	.94	.073	53.6	.436

CFI, comparative fit index; GFI, goodness-of-fit index; TLI, Tucker-Lewis Index; RMSEA, root-mean-square error of approximation; AIC, Akaike's information criterion; ECVI, expected cross-validation index.

DISCUSSION

In the current longitudinal study, we investigated the relationship between variables hypothesized to influence a burn survivor's ability to resist or recover from traumatic stress.⁵ A model of the relationship between personality traits, coping strategies, social support, chronic stress and PTSD was tested with a series of path analyses. The resilience-recovery factors were measured during hospitalization. PTSD symptoms were measured at hospitalization, and at 1 and 6 months postdischarge.

In the initial evaluation of the model at hospitalization, we found that adding two pathways to the model significantly improved the model fit. Based on modification indexes,⁴¹ we added the two pathways to the model- chronic stress positively predicted active coping and avoidant coping demonstrated a neg-

ative association with social support. These additions make substantive sense. Higher chronic stress leads to more efforts to cope. One aspect of avoidant coping may be social withdrawal.

Of the five personality factors, only neuroticism evidenced a substantial relationship with PTSD. Those higher in N exhibited more PTSD symptoms. At hospitalization, avoidant coping mediated almost half the relationship between N and PTSD. At 1 month only the direct effect of N on PTSD was not significant. Extraversion influenced PTSD only through indirect effects mediated by active coping and social support. Based on inspection of total effect, the relationship between E and PTSD was inconsequential. When we tested openness, agreeableness and consciousness in the model, we found no relationship between these personality traits and PTSD symptoms.

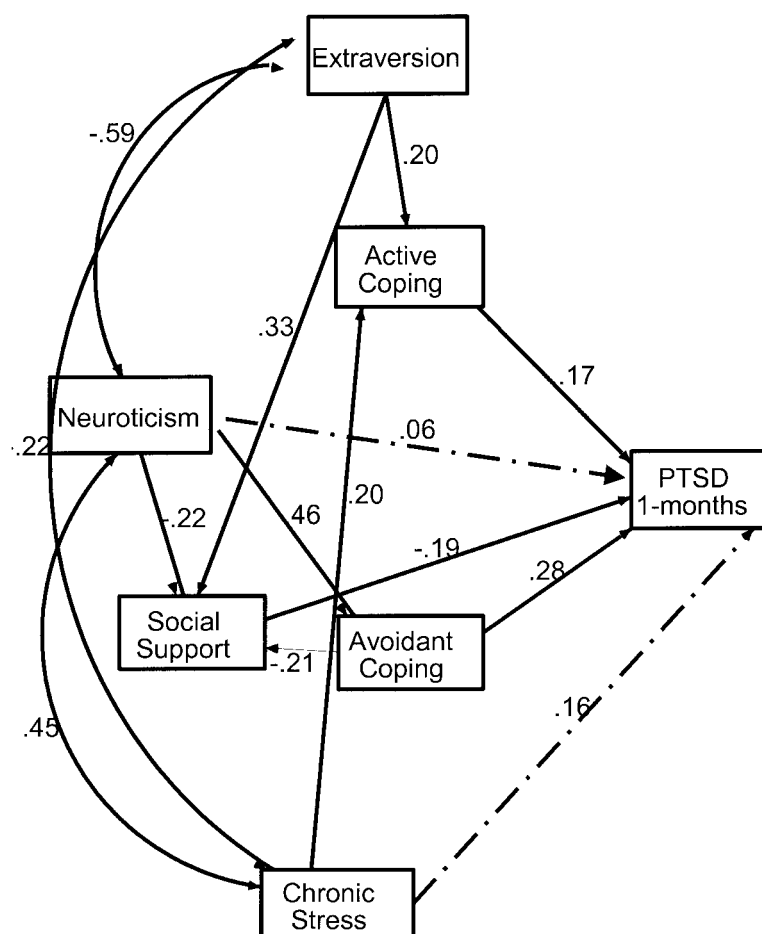


Figure 3. Path analysis for model with standardized estimates at 1 month. PTSD, posttraumatic stress disorder.

Table 4. Standardized direct, indirect and total effects predicting posttraumatic stress disorder symptoms

	N	E	Chronic Stress	Social Support	Avoidant Coping	Active Coping
Baseline						
Direct	.23	0	.11	-.11	.39	.20
Indirect	.20	.01	.05	0	.02	0
Total	.41	.01	.16	-.11	.41	.2
1 Month						
Direct	.06	0	.16	-.19	.28	.17
Indirect	.19	-.03	.04	0	.04	0
Total	.25	-.03	.20	-.19	.32	.17

Those who engaged in avoidant coping had significantly greater PTSD symptoms at hospitalization and 1 month postdischarge. Counter to our hypotheses, active coping demonstrated a positive relationship with PTSD. That is, higher active coping was associated with higher PTSD at each time point. This suggests that burn survivors confronted with PTSD

symptoms try a variety of strategies in an effort to cope with their symptoms.

At each time point, chronic stress and social support were associated with higher PTSD symptoms. However, the effect sizes were not as strong as we anticipated. These relationships may have been weak because they were not measures of ongoing chronic

stress and social support. In addition the distribution of the social support measure was positively skewed limiting the variability of the parameter.

In our posthoc analysis, we found that PTSD at hospitalization was the best predictor of PTSD symptoms at 1 and 6 months. Thus, early identification of the likelihood of developing chronic PTSD symptoms is possible by assessing PTSD symptoms at baseline. There is preliminary evidence that early intervention can help prevent the development of chronic PTSD.⁴⁶⁻⁴⁸

In closing, we will review the strengths and limitations of this study. To our knowledge, this is the first study to test a structural model of PTSD among burn survivors. It is also one of the first studies to investigate the relationship between the big 5 personality traits, coping strategies, and PTSD symptoms.¹¹⁻¹⁴ In addition, there are few longitudinal studies of PTSD development among burn survivors or other trauma populations.¹¹⁻¹⁴

Our limited sample size at 6 months, prevented us from adequately testing the model at this time point. This is in part due to the fact that in any one area of the country the burn survivor population is small; thus, data collection is slow. Also, our attrition rate in the study at 6 months was 40%. This attrition rate is comparable to other longitudinal studies with burn survivors; however, we need to improve this effort.

Another limitation of this study is that the direction of the relationships between variables cannot be determined. That is, at hospitalization PTSD symptoms might have influenced the replies participants made on the other factors measured in the study. "Correlation is not causation." However, a truly prospective study among burn survivors (measuring predictive variables before the burn) is cost-prohibitive.

Last, a note of caution regarding structural equation modeling. "Good fit" does not prove that a model is the best model for explaining the relationships between the variables in a data set. It simply tells the researcher that the model cannot be disconfirmed. Alternative models that are substantially different than the proposed model can often fit the data equally well. Thus, experts in structural modeling have repeatedly emphasized the importance of using theory to guide model specification and study replication.⁴¹⁻⁴³

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