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Impact of Trauma Symptomatology on Personal Networks among Substance Using Women

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Abstract

Background—Interpersonal trauma poses challenges and complications to the development and maintenance of personal networks of substance using women. Few studies have examined its effects on personal network support availability and quality of relationships, limiting our understanding of the social context in which substance using women with a history of trauma are embedded.

Methods—Women with substance use disorders (SUD) who received treatment at three county-funded, women-only intensive treatment programs ($N = 375$) were interviewed at intake and at follow ups 1, 6, and 12 months later. A network software program, Ego Net, elicited 25 network members per respondent, social support availability, and the quality of network relationship at each assessment. Trauma symptomatology was assessed with Trauma Symptom Checklist-40 at intake.

Results—Findings from longitudinal mixed model analyses indicated that higher levels of trauma symptomatology were associated with both a negative, critical quality and less closeness in network relationships over the 12 month study period. However, trauma symptoms were not related to the number of network members reported as providing emotional, concrete, or sobriety support. Effects of trauma symptoms on the support availability in the network and the quality of network relationships were consistent over the follow-up period.

Conclusions—Findings highlight the potential role of trauma symptoms in determining the quality of relationships within personal networks among women with SUD, suggesting the need for routine mapping of network relationships throughout treatment.

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Contributors

Meeyoung O. Min conceptualized the paper, analyzed data, and wrote the initial and final drafts. Elizabeth Tracy designed the study, interpreted the data, and drafted the discussion section. Hyunyoung Park provided data management, data analyses, and literature review. All authors read and approved the final manuscript.

Conflict of Interest

No conflict of interest declared.

Keywords

Women with SUD; interpersonal trauma; personal network; longitudinal mixed model

1. INTRODUCTION

A history of interpersonal traumatic events such as childhood maltreatment and interpersonal violence is strongly linked with the development of substance use disorders (SUD) among women. Approximately 62%-81% of adult women in drug treatment have been victimized by childhood abuse and interpersonal violence (Gil-Rivas, et al., 1997; Liebschutz et al., 2002; Teets, 1995) compared to general population rates of 27%-30% (Kendler et al., 2000; Rees et al., 2011). Also, childhood trauma has been suggested as a common etiological factor in cooccurring mental health problems among substance using women (Min et al., 2007), highlighting the importance of understanding its pervasive and enduring effects on the lives of substance using women.

Trauma poses challenges and complications to the development and maintenance of personal networks of substance using women. Although any personal network can be a source of both support and stress, the personal networks of women with SUD may be more stressful and less optimal since their network members (family, relatives, friends, spouses/partners) may have contributed to their trauma history as perpetrators, enablers, or bystanders (Panchanadeswaran et al., 2008; Savage and Russell, 2005). Further, substance using women tend to be surrounded by a personal network with many members who use also drugs and/or alcohol (Grella, 2008) and such network members may be limited or inconsistent in the sobriety support they provide (Laudet et al., 1999; Tracy et al., 2010). Although network members who use substances or with whom the women have used previously may provide relevant support while the woman is in treatment, such as child care or transportation (Falkin and Strauss, 2003), the negative impact of substance users within the network on recovery tend to outweigh the influence of positive network involvement and support in treatment (Ribisl and Luke, 1993; Mowbray et al., 2005). It is not uncommon for substance using network members to remain in women's networks post treatment (Ellis et al, 2004; Min et al., 2013b).

Given that women are likely to have been introduced to substance use by family members and friends (Center for Substance Abuse Treatment, 2009), personal network relationships and interactions tend to continue to have an influence on women's substance use (Skaff et al., 1999) as well as on their treatment engagement, retention, and outcome (Bond et al., 2003; Center for Substance Abuse Treatment, 2009; Joe et al., 2002; Zywiak et al., 2009). A recent study involving a large community-dwelling population-representative sample who met diagnostic criteria for past-year DSM-IV alcohol dependence reported that individuals with few network ties had a lower probability of pursuing treatment compared to those with many network ties, indicating moderating effects of personal network on treatment utilization (Mowbray, 2014). Social support derived from personal networks has also been shown to mediate the relationship between 12-step attendance and lower substance use (Laudet et al., 2004).

1.1. Attachment Theory, Trauma, and Personal Network

Attachment theory provides an explanatory link between trauma and the development of personal networks. Attachment theory posits that early internal working models of attachment influence interpersonal relationships (Bowlby, 1982). Childhood maltreatment disrupts emotional bonds and produces an insecure attachment style. Compromised attachment has a profound impact on developing capacities for regulating negative affect and the use of others as support in times of need (Charuvastra and Cloitre, 2008), which in turn contribute to the development of a compromised personal network. Thus, exposure to interpersonal trauma influences later connections and attachments to other people (Bowlby, 1988) by limiting an individual's ability to relate to other people, to participate in satisfying social interactions, and to build protective personal networks later in life (Charuvastra and Cloitre, 2008). Quality of personal network relationships may be further compromised as a consequence of additional interpersonal traumas experienced in adulthood. As additional trauma is experienced, mistrust of others is intensified, relationships become conflictual, and intimate close relationships are increasingly more difficult to form (Allen, 2001; Pearlman and Courtois, 2005). In addition, due to early conditioned emotional responses, people exposed to trauma may interact with others in ways (such as extreme neediness out of fear of abandonment or need for control as a means of self-protection) which threaten, disrupt or close off relationships.

Although substantial research has examined the effects of interpersonal trauma on perceived social support among substance using women (e.g., Cosden and Cortez-Ison, 1999; Min et al, 2013a; Stevens et al., 2013), few studies have examined its effects on personal network support availability and quality of relationships, limiting our understanding of the social context in which substance using women with a history of trauma are embedded. Three empirical studies to date have examined the effects of interpersonal trauma on women's personal networks. Gibson and Hartshorne (1996) in a study of 231 largely middle class and caucasian female university students found that women exposed to childhood sexual abuse tend to isolate themselves from others and be less likely to utilize their social support system because they expect that "it is inadvisable, impossible, useless, or potentially dangerous to draw on network resources" (p. 1088). Green et al (2012), using a probability sample of 428 homeless women from temporary shelter settings in Los Angeles County, reported that homeless women with a history of childhood physical abuse tend to have more alcohol and substance users and sexual risk-takers in their network. Also, in a study of 644 women with co-occurring substance abuse and mental health problems from two substance abuse programs in metropolitan areas, Savage and Russell (2005) demonstrated that women afflicted by interpersonal abuse had smaller networks with a lower amount of social support availability. Although these studies have contributed to our understanding of the social context of substance using women with a history of interpersonal trauma, they collectively address only limited aspects of personal networks. Further, since these studies were cross-sectional studies, the question of whether or not trauma is related to personal network changes as women progress through treatment remains unanswered.

1.2. Other Factors Related to Personal Networks

A number of other factors may influence personal network relationships, including personal characteristics of the respondents (age, race/ethnicity, marital status, and education), the presence of co-occurring mental disorders, and treatment status, readiness, and abstinence self-efficacy. Younger age and being African American were related to fewer treatment-related alters (Min et al, 2013b). Women with dual disorders (co-occurring mental disorder and SUD) may experience less social support (Dobkin et al., 2002) and less reciprocity within their personal networks (Bollerud, 1990; Tracy and Johnson, 2007) as compared with women with a substance use disorder only. Treatment motivation, along with treatment status and treatment modality, has been shown to influence personal network composition and quality of relationships (Tracy et al, 2012), although network alters may also influence treatment motivation and engagement (Knight and Simpson, 1996). For example, women in active treatment had more network members from treatment programs and/or 12-Step meetings with more reciprocity in their relationships than women in the engagement stage (Tracy et al., 2012). Previous treatment history and higher abstinence self-efficacy have been found to be related to sobriety support, a key feature of quality in recovery networks. (Min et al., 2013b). We evaluated the contributions of these factors to network variables in the context of trauma symptoms.

1.3. Study Aims

The purpose of the current study is to examine the role of trauma symptoms in longitudinal patterns of personal networks over 12 months among women in substance abuse treatment. As previous studies have well established the high levels of trauma among women with SUD (Grella, 2008), the current study focused on the social support availability within the personal network and the quality of network relationships. Understanding the impact of trauma on personal networks over time provides more detailed information for developing network interventions to improve treatment outcomes. We hypothesized that higher levels of trauma symptoms would be associated with lower availability of network support and poorer quality of relationships, adjusting for the covariates.

2. METHODS

2.1. Participants and Procedure

The study sample consisted of 375 women recruited from three inner-city women-only substance abuse treatment programs: two intensive outpatient programs ($n=256$) and one residential treatment program ($n=119$). The three programs were county-funded for financially disadvantaged consumers with little or no insurance and, at the time of this study, were the only programs in the county providing specialized treatment for women including assessment, individual and group counseling, crisis intervention, and case management. Women were considered study eligible if they were 18 years of age or older, had been in treatment for at least one continuous week, and had a diagnosis of substance dependence defined as a DSM-IV within the past 12 months of entry into the study for at least one substance, including alcohol. Excluded from the study were women with a known diagnosis of schizophrenia or taking medication prescribed for a major thought disorder. A total of 377 women were enrolled in the study; two women were excluded due to incomplete data on

trauma symptoms resulting in the current sample of 375. Overall retention was 93% at T2 and 81% both for T3 and T4. Of the total sample of 375, 93% ($n=349$) completed > 2 of the 4 possible assessments, with 82% ($n=308$) > 3 assessments. Those lost to follow up were more likely to have been in a residential treatment setting and to have reported higher education and higher trauma symptomatology scores; no differences in race, age, homelessness, legal involvement, employment, dual disorder status, or previous treatment history were found.

Face-to-face interviews using computer assisted personal interview format were conducted by trained interviewers at 1 week (T1), 1 month (T2), 6 months (T3), and 12 months (T4) post treatment intake. Participants received a \$35 gift card at each interview, plus travel expense reimbursement. The Case Western Reserve University Institutional Review Board approved the study protocol, which included signed written, informed consent at each follow up interview. A Certificate of Confidentiality was obtained from the Department of Health and Human Services.

2.2. Measures

2.2.1. Independent variable—Trauma symptoms were assessed at T1 with the Trauma Symptom Checklist-40 (Elliott and Briere, 1992; Zlotnick et al., 1996), a 40-item self-report instrument assessing trauma-related symptomatology (anxiety, depression, dissociation, sexual abuse trauma, sexual problems, and sleep disturbance) in adults resulting from childhood and/or adult traumatic experiences. Items were rated on a 4-point scale according to their frequency of occurrence over the prior two months ($0=never$ to $3=often$) with a possible range 0-120. Total trauma symptom score was used for this study, with higher scores indicating greater trauma symptoms. Internal consistency measured by Cronbach's alpha (α) was .93 for this administration.

2.2.2. Dependent variables—Personal network variables, including network social support availability and quality of relationships, were assessed at all four interviews using a social network software program, EgoNet (available from SourceForge.net; McCarty, 2002; McCarty et al., 2007). Respondents were instructed to list 25 people (alters) whom they had had known in the past six months. Respondents were then asked the following questions about each alter listed: how the alter was known (e.g., type of relationship); if the alter used alcohol and/or drugs; and if drugs or alcohol was used with that alter. Network support was measured as the number of alters perceived as *almost always* available for concrete (“giving you a ride or loaning you money”), emotional (“being there for you or listening to you”), and sobriety support (“giving you support to stay clean”). Quality of relationships was measured as negativity, the number of alters perceived as almost always critical, and closeness, number of alters perceived as very close to the respondent.

2.2.3. Covariates collected at one week post treatment intake (T1)—The presence of co-occurring mental disorders was assessed using the Computerized Diagnostic Interview Schedule IV (CDIS; Helzer et al., 1985; Robins et al., 1981), a structured interview based on the criteria in the DSMIV with demonstrated validity and reliability (Robins et al., 1999). Each woman was categorized as dual disorder or SUD only based on

the presence of co-occurring mental disorders. Treatment motivation was assessed with the Treatment Motivation Scale (Joe et al., 1998), a 24 item self-report questionnaire that rated problem recognition, desire for help, and treatment readiness on a 5-point scale (range 24-120). Higher scores indicate greater levels of treatment motivation ($\alpha = .91$). Any type of previous substance abuse treatment history (1=yes, 0=no) was also assessed along with demographic variables including age at one week post treatment intake, race, marital status, and education.

2.2.4. Time-varying covariates—The Drug Abstinence Self Efficacy Scale, modified after the Alcohol Abstinence Self-Efficacy Scale (DiClemente et al., 1994), was used at each follow-up interview. Each woman rated her confidence to abstain from alcohol and drugs across 20 high-risk situations (e.g., feeling depressed or lonely, offered drug or a drink; experiencing physical pain or injury, withdrawal and urges) using a 5-point Likert scale (range 20-100). Higher scores indicate greater confidence ($\alpha = .97$). The Treatment Services Review (TSR; McLellan et al., 1992) was used to assess treatment status (in a treatment program including on wait-list vs. out of treatment) and current (in the past 30 days) alcohol or drug use. High test-retest reliability for TSR has been demonstrated for in-person interviews (McLellan et al., 1992).

2.3. Data analysis

Mixed linear regression models with unstructured covariance matrix were used to estimate the impact of trauma symptoms on personal network support and quality of relationships over 12 months. Homogeneity of the effects of trauma symptoms as well as covariates on personal network variables over time were examined using the interaction terms with time. If the interaction was not significant at $p < .10$, the interaction terms were removed from the model. Missing data were modeled using full-information maximum likelihood (FIML), which utilizes all available information from the observed data. Compared to mean-imputation, listwise, or pairwise models, FIML provides more statistically reliable standard errors (Wothke, 1998). Demographic (age, race, marital status), clinical (dual disorder, treatment modality), and treatment process related (treatment history, treatment motivation, abstinence self-efficacy, treatment status, substance use) variables correlated with the given outcome at $p < .20$ for at least two assessments were entered in the longitudinal model (Mickey and Greenland, 1989), resulting in a different set of covariates adjusted on each personal network outcome measure. Adjusted least squares means (M_{adj}) and standard errors (SE) were calculated from the models. Multicollinearity was also assessed using tolerance and variance inflation factor.

3. RESULTS

3.1 Sample Characteristics

The 375 research participants were primarily African-American ($n=225$, 60%) with a mean age of 36.5 ($SD=10.4$, range= 18-63) (Table 1). Forty-one percent of the sample ($n=154$) had not finished high school, with 72% ($n=260$) of the sample receiving welfare assistance. Only 7% ($n=27$) of the sample were married at intake, 43% ($n=163$) had experienced homelessness at some time in their lives, and 45% ($n=168$) reported current legal

involvement including being on parole, probation, or awaiting sentencing. The mean score for trauma symptoms was 44.7 ($SD=21.4$) with 39% of the sample diagnosed with posttraumatic stress disorder. The primary choice of substance was cocaine with 74% ($n=275$) having a co-occurring mental disorder. The majority of the sample (73%, $n=274$) reported previous substance treatment history prior to this current admission, with the mean age of first substance abuse treatment of 28.17 ($SD=8.79$) years. By 12 months post-intake, 15% ($n=45$) reported being in treatment and 23% of the sample ($n=65$) reported substance use in past 30 days.

At intake, out of 25 alters in the network, on average, 13 ($SD=5.4$) were family members, and 4 ($SD=4.2$) were treatment related alters (professional helpers and peers from treatment and 12-step programs). Nine alters ($SD=4.9$), representing more than one-third of all alters (36%), were substance users, and 6 alters ($SD=4.6$) had used alcohol and drug with the participant in the past 6 months. Although the majority of alters ($M=19.6$, $SD=5.0$) provided sobriety support, fewer alters ($M=12.1$, $SD=6.6$) provided concrete support. On average, 3.5 ($SD=5.5$) alters, comprising 14% of all alters, were reported to be critical of the respondents while 45% of all alters ($M=11.3$, $SD=4.3$) were reported as being very close to the respondents.

3.2 Impact of Trauma Symptoms on Personal Network Support Availability

In the longitudinal analysis with mixed linear models, none of the interaction terms between trauma symptoms and time were significant, indicating that the effect of trauma symptoms on personal network support and quality of relationship did not significantly vary over 12 months. Overall, a significant time effect was noted for all three domains of support availability ($F=11.11$, $p < .0001$ for concrete; $F=5.13$, $p < .002$ for emotional; $F=4.08$, $p < .008$ for sobriety), indicating an increase in the number of alters available for all three types of support over time. The number of alters, adjusted for covariates, available for concrete support was increased from 12.3 ($SE=.33$) at T1 to 14.9 ($SE=.41$) at T4; emotional support from 15.9 ($SE=.39$) to 17.1 ($SE=.37$); sobriety support from 20.2 ($SE=.31$) to 21.1 ($SE=.26$) alters. However, trauma symptoms were not related to the social support availability of alters (Table 2).

In terms of the covariates included in our analyses, residential treatment women reported consistently fewer alters providing concrete support as compared with intensive outpatient treatment women across the 12 months assessed. Older age was related to more alters available for all three types (concrete, emotional, and sobriety) of support. Higher treatment motivation and abstinence self-efficacy scores were related to increased perceived emotional support from alters. Previous treatment history and higher abstinence self-efficacy were related to more perceived sobriety support from alters, with abstinence self-efficacy being related to more perceived emotional support from alters at T2 and T3 only. Substance use in the past 30 days was related to less perceived sobriety support from alters.

3.3 Impact of Trauma Symptoms on Personal Network Quality of Relationship

Higher trauma symptoms were related to more alters who were reported as critical of respondents and fewer alters perceived as very close (Table 2). The number of critical alters

decreased over 12 months ($F=7.53, p < .0001$) from 2.45 ($SE=0.23$) at T1 to 2.32 ($SE=0.26$) at T4. Women from both residential and intensive outpatient treatment increased the number of very close alters over 12 months, with significant increase during the first month of intake (between T1 and T2) for residential treatment women, whereas between T2 and T3 for outpatient women. The number of very close alters, adjusted for covariates, increased from 10.9 ($SE=0.48$) at T1 to 11.7 ($SE=0.32$) at T4 among women in residential treatment and from 11.8 ($SE=0.61$) at T1 to 12.7 ($SE=0.39$) at T4 among women in intensive outpatient treatment. In terms of the covariates, being African American was related to fewer critical alters and more very close alters; greater abstinence self-efficacy was related to more very close alters.

4. DISCUSSION

The present study examined the role of trauma symptomatology in longitudinal patterns of personal networks over 12 months among urban, low income, primarily dually disordered women in substance abuse treatment. Higher levels of trauma symptomatology were associated with personal networks characterized by both a negative, critical quality and less closeness in network relationships at all follow-up interviews over the 12-month study period. However, trauma symptoms were not related to the number of alters available to provide emotional, concrete, or sobriety support. Previous studies indicated that measures of quantitative aspects of personal networks (e.g., number of alters providing support; network size) tend to be less sensitive to post-trauma distress and mental health outcomes than perceived interaction and levels of perceived support (Norris and Kaniasty, 1996; Sarason et al., 1987). This seems consistent with the present findings in that trauma symptomatology was related to perceived quality of relationships, rather than the quantitative number of alters reported as available for social support.

Women with greater trauma symptomatology reported poorer relationship quality represented by more critical and less close alters, indicating an inability to form healthy and secure relationship with others. Social isolation and less closeness from network members, particularly family, can be a consequence of compromised attachment related to previous abuse by close network members (Panchanadeswaran et al., 2008; Pearlman and Courtois, 2005). Given the well-established relationship between trauma and substance abuse among substance-involved women (Grella, 2008; Min et al., 2013a), network relationships may in fact have drawn away, having been over burdened by previous efforts to help women with their substance use. On the other hand, the women, in an effort to maintain sobriety, may have drawn less close to network members due to the fact that so many in their networks continued to be substance users. In our study, substance use in the past 30 days was related to fewer alters reported as providing sobriety support, although substance use was not related to negativity and closeness in relationships. Future studies examining the longitudinal relationships between trauma symptoms, substance use, social support, and personal network outcomes will further clarify our understanding of these complex relationships, by elucidating the evolution of personal networks over time and the shifts in network members and supports as women move in and out of treatment.

Abstinence self-efficacy was related to more emotional and sobriety support availability and close relationships, suggesting improving self-efficacy as a promising intervention target. Warren et al (2007) reported that abstinence self-efficacy predicted less alcohol and cocaine use 6 month after treatment entry among substance users with co-occurring mental disorder in residential drug abuse treatment programs. Our study suggests that abstinence self-efficacy may affect substance use by mobilizing personal network resources. Future studies are needed to clarify the potential role of self-efficacy in shaping network resources among women with SUD.

Limitations in our study should be noted. While our study examined the effects of trauma symptoms on personal networks, lack of data on specific traumatic events/types experienced (e.g., childhood abuse and neglect, interpersonal violence in adulthood, duration, relationship to a perpetrator) precluded the examination of the unique network profiles and trajectories that may arise from different types of interpersonal trauma. Also, lack of repeated assessments of trauma symptoms over 12 months prevented us from examining possible reciprocal effects that may operate between trauma symptomology and personal networks, including whether or not trauma may have been perpetrated by any network alters. Social alienation and isolation (manifested by lack of close alters) and negativity may aggravate trauma symptoms as women are deprived of supportive relationships, which have been found to alleviate those effects (Charuvastra and Cloitre, 2008). Another consideration is that we relied on self-report without independent verification of the nature or provision of support or quality of the relationships from the network members. However, independent verifications from network members or other sources are rare and would be difficult to achieve. Further, it is perceptions of others' behavior and degree of support that shape health behaviors. Lastly, the sample composition may limit the generalizability of the findings to low income inner city women served by county service systems.

Despite these limitations, the present study has multiple strengths including its prospective longitudinal design and strong retention rate. Detailed personal network data were collected in an underserved and understudied client population of low income women. Findings of this study highlight the potential role of trauma symptoms in determining the quality of relationships within personal networks among women with SUD. Despite no relationship between trauma symptoms and number of alters available for the provision of emotional, concrete, or sobriety support, women with greater trauma symptoms had more alters in their networks who were negative toward them and emotionally distant. This suggests the relevance for routine mapping of personal network relationships throughout treatment with a focus on examining how women in treatment negotiate, among others, negative and close ties within their network. In this way, personal network interventions could be individualized beyond universally increasing network size or changing network composition. Effects of trauma symptoms on the personal network were not decreased over the follow-up period, underscoring the importance of trauma informed personal network interventions in substance abuse treatment for women with SUD. Such interventions would recognize and address the impact of childhood and current interpersonal trauma on the quality of network relationships.

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Highlights

- Higher levels of trauma symptomatology were associated with both a negative, critical quality and less closeness in network relationships.
- Trauma symptoms were not related to the number of network members reported as providing emotional, concrete, or sobriety support.
- Effects of trauma symptoms on the support availability in the network and the quality of network relationships were consistent over the follow-up period.

Table 1

Sample Characteristics ($N = 375$)

<i>Socio-demographic & Clinical Characteristics</i>	<i>n</i>	<i>%</i>
Race, African-American	225	60.0
Age, <i>M (SD)</i>	36.5	(10.4)
Education, less than high school	154	41.2
Primary Income, welfare assistance	260	72.4
Marital Status, never married	244	65.1
History of homelessness, yes	162	43.2
Current legal involvement, yes	168	44.8
Trauma symptoms <i>M (SD)</i>	44.7	(21.4)
Treatment modality, Residential treatment	119	31.7
Diagnosis		
Alcohol dependence	175	47.3
Marijuana dependence	148	40.3
Cocaine dependence	212	57.3
Opiate dependence	86	23.2
Generalized anxiety	88	23.5
Posttraumatic stress disorder	147	39.3
Major depressive episode	216	57.8
Manic episode	118	31.6
Co-occurring mental disorder	275	73.5
Previous treatment, yes	274	73.3
Age at first substance abuse treatment, <i>M (SD)</i>	28.2	(8.8)
Treatment motivation, <i>M (SD)</i>	99.2	(13.8)
Abstinence self-efficacy, <i>M (SD)</i>		
Abstinence self-efficacy at T1	75.9	(19.8)
Abstinence self-efficacy at T2	79.6	(16.0)
Abstinence self-efficacy at T3	82.2	(15.8)
Abstinence self-efficacy at T4	80.6	(18.5)
Treatment status		
In treatment at T2	293	87.2
In treatment at T3	90	30.3
In treatment at T4	45	15.0
Substance use in past 30 days		
Substance use in past 30 days at T2	56	16.3
Substance use in past 30 days at T3	56	18.9
Substance use in past 30 days at T4	68	22.7
<i>Personal Network Characteristics at Intake (T1)</i>	<i>M</i>	<i>SD</i>
Composition		
# of family	12.5	5.4
# of treatment related alters	3.6	4.2

<i>Personal Network Characteristics at Intake (T1)</i>	<i>M</i>	<i>SD</i>
# of alters using substances	8.5	4.9
# of alters used with	6.3	4.6
Support		
# of alters providing concrete support	12.1	6.6
# of alters providing emotional support	15.4	5.7
# of alters providing sobriety support	19.6	5.0
Quality of Relationships		
# of critical alters	3.5	5.5
# of very close alters	11.3	4.3

Table 2
Impact of Trauma Symptoms on Personal Network Support and Quality of Relationships ($N=375$)

	Support						Quality of Relationships					
	Concrete			Emotional			Sobriety			Critical		
	B	SE	p	B	SE	p	B	SE	p	B	SE	p
Trauma Symptoms	-.010	.013	.44	-.018	.012	.13	-.006	.010	.51	.006	.002	.01
Time 2	.520	.376	.17	-3.64	1.56	.02	.016	.375	.97	-243	.059	<.001
Time 3	1.394	.452	.002	-3.49	1.74	.046	.455	.387	.24	-198	.064	.002
Time 4	2.556	.449	<.001	2.19	1.63	.18	.937	.386	.02	-.039	.068	.56
Intensive Outpatient (IOP)	1.830	.621	.003	1.062	.554	.06	.850	.449	.06			
IOP X Time 2										-1.177	.525	.03
IOP X Time 3										.561	.614	.36
IOP X Time 4										.124	.669	.85
Age	.117	.028	<.001	.122	.024	<.001	.065	.019	<.001			
African American	.842	.596	.16							-.190	.087	.03
Legal Involvement												
Dual Disorder										.098	.102	.34
Treatment History				.747	.562	.18	1.132	.454	.01			
Treatment Motivation	.040	.023	.08	.041	.020	.04	.017	.016	.31	.004	.003	.20
Abstinence Self-Efficacy	.016	.011	.15	.007	.017	.70	.026	.007	<.001	-.003	.002	.08
Self-Efficacy X Time 2				.043	.020	.03						
Self-Efficacy X Time 3				.052	.022	.02						
Self-Efficacy X Time 4				-.014	.021	.051						
Substance Use (past 30days)				-.822	.465	.08	-.797	.335	.02	.027	.007	<.001

Note. Number of critical alters were square root transformed due to skewed distribution. The blank space indicates that the variable was not significant at the bivariate level and therefore not included in the model. Time 1, Residential Treatment, and White are reference groups.