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What's the Influence of Social Interactions on Substance Use and Treatment Initiation? A Prospective Analysis among Substance-Using Probationers

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Abstract

Introduction: A person's social environment greatly affects the likelihood of substance use, which in turn affects risk for criminal behavior. This study examined how people's social environment early in probation contributed to later substance use and treatment outcome, both of which predict probation success.

Methods: Data were analyzed from a randomized controlled trial of substance-using probationers (N = 316). Moderation analyses assessed the relationship between social support near the start of probation and substance use and treatment initiation after 2 and 6 months.

Results: Abstinence at 2-months was associated with better baseline measures of support quality (more positive support, fewer negative interactions, and reduced conflict). Similar associations were identified for 6-month abstinence including better baseline quality, more positive support, and less family and peer conflict. There were no significant associations between the baseline social support and treatment initiation at 2-months. However, poorer baseline quality support and more negative interactions predicted increased treatment initiation at 6-months.

Conclusions: Social support and the quality of an offender's social network have important implications for substance use and treatment compliance. The criminal justice system emphasizes ways to minimize negative social influences among offenders (i.e., probation conditions that limit contact with other offenders). However, this study suggests that behavior change is a function of not only reducing negative influences but also increasing positive or good quality supports.

Keywords

Criminal Justice; Substance Abuse; Treatment; Social Support

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1. Introduction

Nearly four million people were under probation supervision in the U.S. in 2014 (U.S. Department of Justice, 2015). People on probation are disproportionately likely to use substances, and have physical, mental, and psychosocial problems (Fearn et al., 2016; Skeem, Loudon, Manchak, Vidal, & Haddad, 2009). Substance use during probation is linked to a poorer overall outcome, and thus addressing drug and alcohol use problems is a common target of supervision. Treatment can help people initiate and maintain short-term changes in substance use. However, probation supervision and treatment programs are temporary in nature; most probationers will eventually exit the justice system, primarily through completion or re-incarceration (U.S. Department of Justice, 2015). Long-term abstinence often requires difficult social and environmental changes, in addition to individual behavioral changes, to reduce risk-taking behavior among offenders (Beattie & Longabaugh, 1999).

The relationship between an individual's social environment and substance use and treatment behavior has been well documented. *Social support* is defined as "aid or assistance exchanged through social relationships and interpersonal transactions" (Heaney & Israel, 2008, p. 191). Traditionally, social support has been viewed as a singular construct or a construct with various components that can be captured in a single measure (Beattie & Longabaugh, 1999). However, the theoretical and empirical literature presents different dimensions and processes that work within the overarching factor of social support. For instance, one common way to conceptualize social support is in terms of quantity and quality. The *quantity* of social support involves the perceived availability of social resources (Wasserman, Stewart, & Delucchi, 2001). Social support *quality* refers to the worth of emotional and tangible resources provided by others (Cohen & Wills, 1985). Further, social support quality can be divided into two constructs of positive and negative social interactions. A *positive social interaction* can be defined as a constructive exchange between persons (e.g., providing emotional or tangible support) (Bahr, Harris, Fisher, & Harker Armstrong, 2010). Conversely, *negative social interactions* (or social undermining) can be defined as destructive exchanges between individuals (e.g., criticism or shared risk-taking behavior) (Bahr et al., 2010). Social constructs can have a positive or negative influence on behavior depending on the relationship between persons and the intent of the interaction.

There is considerable empirical evidence of the protective effect of social support for preventing and reducing substance use (Strauss & Falkin, 2001). Among treatment samples, individuals with better social support demonstrate decreased substance use behavior (Owens & McCrady, 2014) and fewer instances of relapse (Ellis, Bernichon, Yu, Roberts, & Herrell, 2004; McMahon, 2001; Slaght, 1999) compared to those with poorer social supports. People with better social support are also more likely to initiate treatment (Brown, Bennett, Li, & Bellack, 2011; Lemieux, 2002), complete treatment (Skeem et al., 2009), and maintain abstinence following treatment (Ellis et al., 2004; Havassy, Hall, & Wasserman, 1991; Slaght, 1999) compared to people with poorer social support. Abstinence-specific social support helps to reduce substance use and improve treatment outcome because it generates a social environment that promotes abstinence efforts (e.g., perceived helpfulness from others,

reduced drug exposure) (Beattie & Longabaugh, 1999; Majer, Jason, Ferrari, Venable, & Olson, 2002; Wasserman et al., 2001).

Some researchers have found significant associations between greater amounts of social support and improved substance use and treatment outcomes (Beattie, 2001; Havassy et al., 1991; Lemieux, 2002; McMahon, 2001; Warren, Stein, & Grella, 2007), while others have not (De Li & MacKenzie, 2003; Mowen & Visher, 2015; Spohr, Suzuki, Marshall, Taxman, & Walters, 2016). Thus, it may be important to more clearly delineate from whom the social support is originating and the quality of that support. High quantity does not necessarily indicate greater positive social influences. Some researchers have concluded that it is not the quantity of social support that is important but the quality of the support given (Ellis et al., 2004), but it is also possible that the impact of social support quantity is a function of its quality. This question is particularly relevant for justice-involved populations who are more likely to be around negative social influences.

When social network members are unaware of or insensitive to the needs of an individual in recovery, particularly if those network members are users themselves, it will be more difficult to maintain abstinence (Beattie & Longabaugh, 1999; Schroeder et al., 2001; Wasserman et al., 2001). Distinctions between positive and negative interactions are important because probationers often belong to poor social networks and rely on social support from individuals who may also be engaging in substance use and criminal activity (Owens & McCrady, 2014; Stone, Jason, Stevens, & Light, 2014; Wolff & Draine, 2004). While treatment samples may experience the protective effect of greater availability of support (Beattie, 2001; Havassy et al., 1991; McMahon, 2001; Warren et al., 2007), these findings may not be consistent for criminal justice populations.

The study of social influence and social support among substance-using offenders is complex and multidimensional. Researchers have noted the rehabilitative potential of an offender's social network as a major criminal justice concern (Lemieux, 2002). Offenders who engage in substance abuse treatment during probation have increased abstinence, reduced recidivism, and improved probation outcomes (Linhorst, Dirks-Linhorst, & Groom, 2012; Owens McCrady, 2014; Skeem et al., 2009). Offenders who lack social supports post-incarceration are more likely to return to high-risk behaviors (Graffam, Shinkfield, Lavelle, & McPherson, 2004; Seiter & Kadela, 2003). For individuals involved in the justice system, family relationships can become strained due to criminal activity and substance use putting successful re-integration at risk (Mowen & Visher, 2015; Phillips & Lindsay, 2011). Conflict and stress both serve as powerful precipitants of relapse. There is ample evidence that negative influences and family/peer conflict can impact an individual's ability to achieve and maintain abstinence following treatment (Ellis et al., 2004; Fals-Stewart, O'Farrell, & Hooley, 2001; Mowen & Visher, 2015; Tracy, Kelly, & Moos, 2005).

There is some evidence for a differential effect of social support on substance use depending on the quality and quantity of support received. Spohr and colleagues (Spohr et al., 2016) found social support quality functioned as a protective factor while quantity was a risk factor for engagement in risky behaviors (sexual risk-taking behaviors, criminal risk, and substance use). Increases in social support availability were associated with increased sexual risk-

taking and substance use, but not future offending (criminal risk level). To better understand the differential impact of quantity and quality, it may be important to determine how the quantity of social support varies with different levels of quality. Additionally, it would be prudent to know if one or a few conflictual relationships can lead to increased substance use even when the individual's social support network is generally of good quality--a few bad apples rotting the whole barrel.

Relatively little research has explored the interaction of social support quality and quantity on abstinence and treatment initiation among offenders. While social support is often assumed to be protective against risk-taking behaviors, it is not well understood how positive and negative sources of social influence might interact to affect behavior (Bahr et al., 2010; Giordano, Clarke, & Furter, 2014; Mowen & Visser, 2015; Stone et al., 2014). Some researchers have suggested that positive and negative interactions may affect deviant behavior differently (Bahr et al., 2010; Shinn, Lehmann, & Wong, 1984). Finally, it is important to consider how additional social network factors can moderate the associations between social support quantity as a function of quality. Social factors do not function in isolation, variations and combinations of social constructs can and do lead to a unique influence on behavior; to say nothing of the individual and community factors that are beyond the scope of this paper. Therefore, the further inclusion of relationship conflict may be able to provide additional explanations regarding its relative significance on substance use outcomes.

This exploratory study investigated how aspects of social influence interact to impact substance use and treatment initiation among probationers. Accordingly, this study had three objectives: 1) Evaluate the effect of social support quantity (SS Quantity) at varying levels of social support quality (SS Quality) on early probation outcomes, i.e., substance use behaviors and treatment initiation at 2 and 6-month follow-up, 2) Evaluate the effect of SS Quantity, at varying levels of positive and negative social support (Positive SS and Negative SS), on substance use outcomes, and 3) Evaluate the effect of SS Quantity, at varying levels of SS Quality and relationship conflict, on substance use outcomes. Given the potential impact of social influence on substance use and treatment initiation, it is important to determine the role that different types of social influences play and how best to leverage these varying social factors (e.g., improved quality, greater quantity, reduced conflict) to improve outcomes.

2. Methods

2.1. Study Description

MAPIT (Motivational Assessment Program to Initiate Treatment) was a randomized controlled trial testing the efficacy of two methods of increasing probationer engagement in treatment and reduction of substance use ([R01 DA029010-01](#), MPI: Walters & Taxman). Eligible participants were: 1) 18 years of age or older; 2) sentenced to probation; 3) able to provide informed consent; 4) English-speaking; 5) sentenced to a court date for probation or released from jail within the previous 30 days, and 6) self-reported any illicit drug use and/or heavy alcohol use (five or more drinks for men; four or more drinks for women in a single

episode) in the previous 90 days. The trial is described elsewhere (Taxman, Walters, Sloas, Lerch, & Rodriguez, 2015).

This study used data from the baseline assessment and 2 and 6-month follow-up interviews. Participant demographics, social support, criminal cognitions, and baseline substance use and treatment attendance were gathered from the baseline assessment. Outcome data for substance use and treatment attendance were gathered from the 2 and 6-month follow-up interviews.

2.2. Participants

Participants were substance-using probationers in Dallas, TX and Baltimore City, MD (N = 316). The sample is described fully elsewhere (Lerch, Walters, Tang, & Taxman, 2017). While some differences were found between criminal risk level, age, and race, there was no significant difference in gender between sites. Within the criminal social support literature, gender is a significant demographic factor that would affect social support (Clone & DeHart, 2014; Strauss & Falkin, 2001). The sample was primarily male (66.1%), with a mean age of 35 years (SD = 11.7). Sixty-four percent of the sample were Black/African American, 22.5% were White, 7.3% were Other, and 6.3% were Multiracial. Most participants reported at least a high school education (44.9%), 12.3% reported less than high school education, 16.1% reported education equivalent to an associate's degree, and 2.5% reported more than two years of college. In the three months prior to baseline, 52.8% of probationers reported being unemployed, 23.7% employed full-time, and 13.3% employed part-time. Most participants reported being single (66.5%), 19.9% reported being divorced/separated/widowed, and 13.6% were married. Two-thirds of the sample were identified as low or moderate risk and 34.2% were high-risk offenders. Nearly 40% of probationers were mandated to attend treatment as part of their probation requirements.

2.3. Materials

The Medical Outcomes Study - Social Support Survey (MOS-SSS; Sherbourne & Stewart, 1991) measures perceived availability of social support in four areas: emotional/informational support, instrumental/tangible support, affectionate support, and positive social interaction. The MOS-SSS demonstrates acceptable reliability and internal-consistency with each subscale exceeding $\alpha = 0.90$ among patients with chronic conditions (Sherbourne & Stewart, 1991). The survey has demonstrated convergent and discriminant validity when correlated with other health measures (Sherbourne & Stewart, 1991).

The Addiction Severity Index Lite (ASI-Lite; McLellan, Cacciola, Carise, & Coyne, 1999; McLellan, Luborsky, Woody, & O'Brien, 1980) assesses several aspects of social support including living with persons who abuse substances, relationship conflict, and relationship quality characteristics. The ASI-Lite assesses an individual's positive (e.g., you help each other with problems, you got along together) and negative (e.g., you used illegal drugs together) interactions with parental figures, siblings, spouse/significant other, and friends during the past six months. Additionally, the ASI-Lite assesses the participant's relationship problems/conflicts with various social connections including parents, siblings, partner/spouse, friends, neighbors, coworkers, and children during the past 30 days.

The Timeline Follow-back survey (TLFB; Sobell & Sobell, 1996) measures the daily consumption of alcohol, marijuana, opiates, cocaine, hallucinogens, barbiturates, inhalants, amphetamines, and prescription pain pills. Alcohol use was quantified as daily standard drinks (i.e., 12-ounce beer, 5-ounce glass of wine, and 1.5-ounces of liquor), while illicit drug use was measured as frequency of daily use. The TLFB survey also measured daily treatment attendance for six different treatment types including residential treatment, inpatient, outpatient, detox, medical treatment, self-and help groups (AA/NA/CA). Among treatment samples, the TLFB demonstrates acceptable convergent and discriminant validity compared to other self-report (Norberg, Mackenzie, & Copeland, 2012) and biological measures (Hjorthoj, Hjorthoj, & Nordentoft, 2012; Rendon, Livingston, Suzuki, Hill, & Walters, 2017).

2.4. Analysis Plan

2.4.1. Variables of Interest

Social Support Quantity.: SS Quantity was derived from the MOS-SSS and defined as the perceived availability of social support should the individual need it. Individuals rated how often various kinds of social support (e.g., someone who hugs you, someone to take you to the doctor, or someone you can talk to about problems) were available to them measured on a five-point Likert scale from ‘none of the time’ to ‘all of the time’. The survey items were averaged in which a higher score indicated a higher perceived availability of social support (high quantity) and a lower score indicated a lower perceived availability of social support (low quantity). The SS Quantity measure showed acceptable reliability and consistency (Spohr et al., 2016).

Social Support Quality.: SS Quality was derived from the ASI-Lite and defined as the worth of four relationship types (i.e., parents, siblings, friends, and spouse) in the past 6-months. Items are measured on a five-point Likert scale from ‘never’ to ‘always’. Subscales were developed for positive relationship aspects (e.g., you help each other with problems, you got along together) and negative relationship aspects (e.g., you used illegal drugs together, blamed or fussed at about things you did/did not do) independently. Separate scores were created by averaging the positive and negative support items across the available relationship types. An overall SS Quality measure was created by averaging all items across relationship types with a higher score indicating better quality support and a lower score indicating poorer quality support. We performed preliminary psychometric validation corresponding to our unique sample. The SS Quantity measure showed acceptable reliability and consistency (Spohr et al., 2016).

Relationship Conflicts.: The level of relationship conflict was assessed using data from the ASI-Lite family and social section. Conflict was measured as the number of close relationships with whom the individual had serious problems getting along with in the previous 30 days. Individuals were asked to evaluate whether they had serious conflict with parents, siblings, partner/spouse, friends, neighbors, coworkers, and children. Conflict scores ranged from 0 – 9, with higher scores indicating greater frequency of relationship conflict.

Substance Use.: TLFB data was used to determine whether the person reported illicit drug or heavy alcohol use (yes, no) at 2 and 6 months. Substances were collapsed in this study as relapse processes are similar across major drugs of abuse and may not necessarily need to be assessed separately (Havassy et al., 1991).

Treatment Initiation.: TLFB data was used to determine whether the person had attended two or more days of treatment at 2 and 6 months. This definition reduces the potential inclusion of one-time only treatment attendance, such as a required substance abuse assessment visit, and ensures a reliable estimate of actual initiation (Green, Polen, Dickinson, Lynch, & Bennett, 2002; McLellan et al., 1994).

2.4.2. Statistical Analysis—Independent samples t-tests and chi-square analyses were used to evaluate basic demographics. Logistic regression was used to evaluate the association between social support predictors and the probability of using substances and initiating treatment at 2 and 6 months while controlling for gender, age, race (minority vs. non-minority), and criminal risk level (low/moderate risk and high risk). In the treatment initiation regression models, we also controlled for whether the participant was court-mandated to attend treatment. Moderation analyses were used to explore the effect of SS Quantity on substance use and treatment initiation at different levels of social influence. Moderation analyses were conducted using logistic regression.

3. Results

Table 1 shows the association between individual characteristics and the primary outcomes of interest. At 6-months, gender and substance use was found to be dependent ($\chi^2 = 7.09$, $p < .01$). No significant associations were found between substance use and race, criminal risk level, education, employment, and marital status. There was no significant difference in mean SS Quantity and Quality ratings between abstinent and substance-using probationers at 6-months. People who used substances at 6-months demonstrated significantly lower Positive SS on average compared to people who were abstinent ($t = 2.47$, $p < .05$). However, no significant difference was found between average Negative SS ratings among substance-using and abstinent probationers at follow-up. On average, people who used substances at 6-months had a greater number of relationships with serious conflict compared to people who were abstinent ($t = 3.49$, $p < .001$).

On average, probationers who initiated treatment at 6-months were significantly older than those who did not initiate treatment ($t = 5.52$, $p < .001$). Additionally, there was a significant association between substance use and criminal risk level, wherein 28.6% of low/moderate risk participants reported substance use at 6-months compared to 55.2% of high risk participants ($\chi^2 = 19.3$, $p < .001$). Probationers who initiated treatment at 6-months were significantly more likely to be unemployed compared to those who did not initiate treatment ($\chi^2 = 5.14$, $p < .05$). Those who were court mandated to treatment were more likely to initiate treatment at 6-months ($\chi^2 = 27.2$, $p < .001$). Finally, multicollinearity was assessed by evaluating tolerance (< 0.10) and VIF (< 10) statistics of the continuous social support predictors (Menard, 1995; Myers, 1990). All values were found to be within an acceptable range.

3.1. Impact of Social Support Quantity and Quality

To evaluate whether the effect of SS Quantity on substance use and treatment initiation was moderated by SS Quality, we estimated two-way interactions between SS Quantity and SS Quality. Because these interactions were not significant across all combinations of our outcomes and follow-up times, we present our main effects models in Table 2. SS Quality significantly predicted 2-month substance use. For a unit increase in SS Quality, the odds of being a substance user decreased by 63.8%. Similarly, at 6 months, SS Quality significantly predicted 6-month substance use. For a unit increase in SS Quality, the odds of being a substance user decreased by 49.9%. Results for treatment initiation were less consistent. At 2 months, neither SS Quality or SS Quantity were associated with treatment initiation. However, at 6 months, better quality support was associated with a lower odds of treatment initiation. For a unit increase in SS Quality, the odds of initiating treatment decreased by 51.1%.

3.2. Role of Positive and Negative Social Interactions

To evaluate whether the effect of SS Quantity varied across levels of Positive SS and Negative SS on substance use and treatment initiation, we estimated a series of logistic regressions beginning with three-way interactions between SS Quantity, Negative SS, and Positive SS followed by two-way interactions. None of the three-way or two-interactions were statistically significant, across all combinations of our outcomes and follow-up times. Therefore, we present the results from our main effects models in Table 2.

At 2 months, both Positive SS and Negative SS predicted substance use. Less positive support and more negative support increased the odds of being a substance user. For a unit increase in Positive SS, the odds of being a substance user decreased by 40.4%. Conversely, for a unit increase in Negative SS, the odds of being a substance user increased by 66%. At 6 months, only Positive SS predicted substance use. For a unit increase in Positive SS, the odds of being a substance user decreased by 51.5%. At 2 months, SS Quantity, Positive SS, and Negative SS were not associated with treatment initiation. At 6 months, only Negative SS predicted treatment initiation. For a unit increase in Negative SS, the odds of a probationer initiating formal treatment were 1.9 times higher compared to those with lower negative supports.

3.3. Impact of Relationship Conflict

To evaluate whether the effect of SS Quantity varied across levels of SS Quality and relationship conflict on substance use and treatment initiation, we estimated a series of logistic regressions beginning with three-way interactions between SS Quantity, SS Quality, and conflict followed by two-way interactions. None of the three-way or two-interactions were statistically significant, across all combinations of our outcomes and follow-up times. Therefore, we present the results from our main effects models in Table 2.

At 2 months, both relationship conflict and SS Quality predicted substance use. More relationship conflict and lower quality support were associated with increased odds of being a substance user. For each increase in the number of relationships a probationer experiences significant conflict with, the odds of being a substance user increased by 23.8%.

Additionally, for a unit increase in SS Quality, the odds of being a substance user decreased by 56.6%. At 6 months, only relationship conflict predicted substance use. For each increase in the number of relationships with which a probationer experiences significant conflict, the odds of using substances were 1.4 times that compared to those with less conflict. At both 2 and 6 months, SS Quantity, SS Quality, and conflict were not significant predictors of treatment initiation.

4. Discussion

Our results suggest that social support is an important predictor of substance use and treatment behavior during probation. Abstinence at 2-months was associated with better overall support quality, more positive supports, and lower negative interactions and conflict. Similar associations were identified for 6-month abstinence including better overall quality, greater positive support, and less family and peer conflict. There were no significant associations between the social interaction variables and treatment initiation at 2-months. It is possible these null findings are due to small sample sizes; 59 (18.7%) of individuals met the definition of treatment initiation at 2-month follow-up, compared to 107 (33.9%) of individuals at 6-months. Treatment initiation at 6-months was associated with poorer overall support quality and more negative social interactions.

SS Quality was a significant predictor of substance use and treatment initiation. When evaluating both SS Quantity and Quality simultaneously, quality was consistently associated with the desired outcome, while quantity was not predictive of substance use or treatment initiation. These results support previous conclusions that improvements in support quality may be more significant than growth in social network structure (Ellis et al., 2004). Quality social support is an important factor for increased abstinence and treatment efforts among both offender and general treatment samples (Ellis et al., 2004; Lemieux, 2002). Good quality relationships may also serve as a buffer against criminogenic strains that lead to arrest (Gogineni, Stein, & Friedmann, 2001; Skeem et al., 2009).

Previous research has generally found that increasing quantity or availability of support is associated with improved outcomes and a lower risk for relapse following treatment (Havassy et al., 1991; Warren et al., 2007). Among offender populations, however, greater support availability may present greater opportunities for relapse, particularly when a person spends time with other people who use substances (Ellis et al., 2004; Gogineni et al., 2001). Further research is necessary to determine for which populations and situations SS Quantity acts as a risk or protective factor for substance use and treatment initiation.

Higher Positive SS at baseline was associated with decreased odds of being a substance user after 2- and 6-months. On the other hand, greater levels of negative support increased the odds of substance use at 2-months. Our findings are consistent with previous literature stressing the independent roles of positive and negative influence on substance use (Ellis et al., 2004; Mowen & Visser, 2015). This is an important distinction because probation conditions generally discourage contact with negative influences (i.e., gang members, felons), but are agnostic to the frequency of contact with positive supports. Not only is positive support associated with abstinence, but others have found Positive SS to be

predictive of lower recidivism and better quality of life post-release (Spjeldnes, Jung, Maguire, & Yamatani, 2012). This conclusion fits with a general call to better understand social support as a factor that influences probation outcome (Taxman, 2017).

We found that relationship conflict predicted 2 and 6-month substance use outcomes. Substance use at 2-months was associated with both low-quality support and high relationship conflict. These findings suggest that family support and conflict operate differentially on substance use behavior (Mowen & Visser, 2015). Additionally, higher levels of relationship conflict were associated with increased odds of continuing substance use at 6-months. This is consistent with previous research finding a strong association between conflict and substance use (Bahr et al., 2010; Mowen & Visser, 2015). Interpersonal problems can act as precipitants of substance use (Semple, Strathdee, Zians, & Patterson, 2009), and Mowen and Visser (2015) found that higher levels of family conflict during incarceration was associated with increased substance use and crime following release. Probationers who experience high conflict and low social integration may not be motivated to engage in health promoting behaviors such as abstinence (Cohen & Wills, 1985; Mowen & Visser, 2015). Because of the relationship between substance use and conflict, it may be important for probation officers and treatment providers to assess interpersonal conflict as an early indicator of risk for substance use problems.

We found that 6-month treatment initiation was associated with *poorer* quality support and *more negative* social interactions with friends and family. While these results may seem counterintuitive, it is possible that probationers with poorer support systems are more likely to engage in treatment because of the need to find alternative support networks that will encourage abstinence-related behavior. That is, probationers with few social supports may need a recovery community that supports substantive changes. Without core supports, probationers are forced to seek out formal support from professional relationships or treatment programs to make the necessary behavioral changes to be successful on probation.

Poor social support systems at the start of treatment are generally associated with lower engagement and completion (Sung, Belenko, Feng, & Tabachnick, 2004; Tracy et al., 2005). However, for offenders the effect of social support may differ from before to after treatment. Further research is needed to determine how social support and social interactions impact each stage of treatment (i.e., initiation, engagement, and completion). Our results highlight the need to develop social support interventions to help probationers strengthen their natural support environments which will outlast formal/professional support networks (Beattie & Longabaugh, 1999).

4.1. Study Implications

Our findings suggest probationers with overall good quality support, more positive support, and less relationship conflict have decreased odds of substance use at follow-up. Our results emphasize the importance of social support systems for a probationer's ability to change substance use behavior. Historically, the justice system has focused on reducing the influence of negative social contacts, such as other offenders or gang-involvement. In addition, it may be important to look for ways to increase positive support (e.g., accountability partners, peer recovery supports) as a condition of probation. For instance, the

justice system might place a preference on treatment programs that incorporate social support (e.g., interventions to increase social support, inclusion of support providers, skills training) or emphasize social support programs directly. Likewise, there is evidence that involving family members can make treatment more effective (Bertrand et al., 2013). Finally, it may be important to develop treatment models that emphasize naturally-occurring positive supports (Copello et al., 2002; Kidorf, Brooner, & King, 1997).

In their review of interventions for prisoner populations, Pettus-Davis, Howard, Roberts-Lewis, and Scheyett (2011) identified very few programs that included social support as a key component. *Project Greenlight* was a multi-component transitional program for prisoners, (Bobbitt & Nelson, 2004) in which family members of former prisoners were invited to participate in three types of counseling sessions: 1) couples – relationship with partner, 2) co-parenting – relationships with children, and 3) nuclear family – relationships with parents, siblings, and other family. *La Bodega* was a service and treatment based program for parolees and probationers with substance use histories (Sullivan, Mino, Nelson, & Pope, 2002). Through a combination of case management, workshops, family counseling and support groups, *La Bodega* targeted strengthening an offender's support system with family to prevent relapse. At a 6-month follow-up, offenders who received the intervention reported a 38% reduction in substance use compared to 13% in a comparison group. Social support interventions with former prisoners reflect a mix of naturally occurring support and professional support interventions, and while few studies have been conducted in this area, the results are encouraging.

4.2. Limitations

This study has several limitations. First, power analyses were not conducted for this secondary analysis due to a fixed sample. As all objectives included interaction models, either two-way or three-way, a structured step-down approach was utilized to find significant associations between the social interaction predictor variables and main outcomes of interest. Second, our results may have been affected by missing data. Some probationers did not respond to SS Quality items if they did not have a relationship with that individual (i.e., siblings). What is not known, from the data gathered in this study, is whether the probationer did not have siblings or whether they were estranged from their siblings. This study did not gather information on the structure of a probationer's network or the behaviors of those in their network. Third, we did not evaluate improvements or changes in social support. We only evaluated the role of *net* supports and influences, so we can only make conclusions regarding the outcomes between groups of probationers with good and poor quality social support at the beginning of probation. Fourth, we did not evaluate social competence, which could impact a probationer's ability to develop and maintain social connections and draw from social resources. Lastly, we did not assess the differential impact of the social influences on males and females; our sample had too few females to permit reliable and valid analysis of outcomes.

Based on the limitations of our study, future research should evaluate the quantity and quality of social support within a probationer's social network structure. Studies should also assess changes in social support over the course of probation to determine whether changes

in social support are associated with substance use and treatment initiation. Future research should evaluate how social competence may affect the relationship between social support and substance use and treatment initiation. Finally, researchers should evaluate whether the relationship between social support and substance use and treatment initiation varies between men and women

4.3. Conclusions

Our results suggest that early social support systems can be predictive of substance use and treatment initiation while on probation. Probationers with good quality support and more positive interactions had decreased odds of continuing to use substances at follow-up. Alternatively, those with high negative interactions and conflict had increased odds of continuing to use substances at follow-up. This suggests that behavior change is a function of not only reducing negative influence but also increasing positive or good quality supports.

Probationers with insufficient social support systems (e.g., low quality support, high negative interactions) had increased odds of initiating treatment at 6-months. It is possible that probationers with poor social environments may need to access treatment services and seek professional support systems to meet the demands of probation conditions. Programs that help probationers change natural social support networks may have a longer-lasting impact on substance use (Beattie & Longabaugh, 1999). The criminal justice system could benefit from the integration of positive social support and family-based interventions to improve probation outcomes.

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Highlights

- Abstinence was associated with better baseline measures of support quality
- More positive support, few negative interactions and conflict predicted abstinence
- Treatment was associated with poorer baseline measures of support quality
- Poor quality support and more negative interactions predicted treatment initiation

Table 1.

Participant Characteristics of 6 Month Substance Use and Treatment Initiation (n %).

	Substance Use		Treatment Initiation	
	Substance Use (n = 209)	Abstinent (n = 97)	Yes (n = 107)	No (n = 178)
Gender				
Male	133 (63.6) **	61 (80.3)	70 (65.4)	124 (69.7)
Female	76 (36.4)	15 (19.7)	37 (34.6)	54 (30.3)
Age, M(SD)	34.5 (11.4)	36.6 (12.5)	39.8 (11.6) ***	32.3 (10.9)
Race				
Minority	155 (74.2)	63 (82.9)	83 (77.6)	135 (75.8)
White	54 (25.8)	13 (17.1)	24 (22.4)	43 (24.2)
Criminal Risk Level				
Low/Moderate Risk	140 (67.0)	49 (64.5)	54 (50.5) ***	135 (75.8)
High Risk	69 (33.0)	27 (35.5)	53 (49.5)	43 (24.2)
Education Level				
High School or Less	162 (77.5)	58 (76.3)	81 (75.7)	139 (78.1)
At Least Some College	47 (22.5)	18 (23.7)	26 (24.3)	39 (21.9)
Employment				
Unemployed	127 (60.8)	46 (60.5)	74 (69.2) *	99 (55.6)
Employed/Student	82 (39.2)	30 (39.5)	33 (30.8)	79 (44.4)
Marital Status				
Single/Never Married	145 (69.4)	45 (59.2)	66 (61.7)	124 (69.7)
Married	27 (12.9)	11 (14.5)	18 (16.8)	20 (11.2)
Divorced/Separated/Widowed	37 (17.7)	20 (26.3)	23 (21.5)	34 (19.1)
Homeless (within past 3 months)	31 (15.0)	8 (10.5)	20 (18.7)	19 (10.8)
Court Mandated Treatment	78 (39.6)	30 (42.3)	61 (60.4) ***	47 (28.1)
SS Quantity, M(SD)	3.8 (1.1)	3.8 (1.1)	3.8 (1.1)	3.8 (1.0)
SS Quality, M(SD)	3.8 (0.5)	3.9 (0.5)	3.7 (0.5)	3.8 (0.5)
# of Significant Conflicts, M(SD)	1.4 (1.4) ***	0.8 (1.1)	1.2 (1.3)	1.2 (1.3)
Positive SS, M(SD)	3.7 (0.7) *	3.9 (0.6)	3.7 (0.7)	3.8 (0.6)
Negative SS, M(SD)	2.2 (0.6)	2.1 (0.5)	2.3 (0.5)	2.1 (0.5)

Note:

*
p < .05;**
p < .01;***
p < .001.

Frequency data were analyzed using Pearson chi-square test for significance and continuous variables were analyzed using independent samples t - test.

Table 2. Logistic Regression Models of Social Interactions on Substance Use and Treatment Initiation among Probationers.

	Substance Use ^d			Treatment Initiation ^b				
	2-month ^c		6-month ^d	2-month ^e		6-month ^f		
	OR	95% CI		OR	95% CI	OR	95% CI	
Model 1								
SS Quantity	1.12	(0.88, 1.43)	1.19	(0.89, 1.58)	0.97	(0.70, 1.36)	1.17	(0.88, 1.57)
SS Quality	0.36 [*]	(0.20, 0.65)	0.50 [*]	(0.25, 0.99)	0.82	(0.38, 1.75)	0.49 [*]	(0.25, 0.96)
Model 2								
SS Quantity	1.15	(0.89, 1.50)	1.32	(0.97, 1.79)	0.95	(0.66, 1.36)	1.11	(0.81, 1.52)
Positive Support	0.60 [*]	(0.39, 0.90)	0.49 ^{**}	(0.29, 0.81)	1.01	(0.58, 1.78)	0.93	(0.57, 1.52)
Negative Support	1.66 [*]	(1.05, 2.64)	1.03	(0.60, 1.77)	1.22	(0.66, 2.28)	1.86 [*]	(1.08, 3.20)
Model 3								
SS Quantity	1.15	(0.90, 1.48)	1.25	(0.93, 1.67)	0.97	(0.69, 1.35)	1.08	(0.84, 1.38)
SS Quality	0.43 ^{**}	(0.24, 0.80)	0.66	(0.32, 1.35)	0.76	(0.34, 1.71)	0.52	(0.26, 1.06)
Relationship Conflict	1.24 [*]	(1.01, 1.52)	1.40 ^{**}	(1.07, 1.84)	0.93	(0.69, 1.24)	1.19	(0.88, 159)

Note: OR = Odds Ratio; 95% CI = 95% Confidence Interval.

^{*} $p < .05$,

^{**} $p < .01$,

^{***} $p < .001$.

^a Models controlled for participant age, gender, race, and criminal risk level.

^b Models controlled for participant age, gender, race, criminal risk level and whether the probationer was mandated to attend substance use treatment.

^c N = 295.

^d N = 285.

^e N = 277.

^f N = 268.