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## Social Connections and Suicidal Thoughts and Behavior

**Sungeun You,**

Chungbuk National University

**Kimberly A. Van Orden,** and

University of Rochester Medical Center

**Kenneth R. Conner**

University of Rochester Medical Center and Canandaigua VA Center of Excellence

### Abstract

Disrupted social connectedness is associated with suicidal thoughts and behaviors among individuals with substance use disorders (SUDs). The current study sought to further characterize this relationship by examining several indices of social connectedness—1) living alone, 2) perceived social support, 3) interpersonal conflict, 4) belongingness. Participants ( $n = 814$ ) were recruited from four residential substance-use treatment programs and completed self-report measures of social connectedness as well as whether they had ever thought about or attempted suicide. Multivariate results indicated that interpersonal conflict and belongingness were significant predictors of a history of suicidal ideation, and belongingness, perceived social support, and living alone were significant predictors of suicide attempt. These results indicate the most consistent support for the relationship between suicidality and thwarted belongingness, and also support the clinical utility of assessing whether individuals live alone.

### Keywords

suicide attempts; suicidal ideation; loneliness; thwarted belongingness; social support

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Substance dependence confers elevated risk for suicidal ideation (i.e., thoughts about killing oneself; Grant & Hasin, 1999) and suicide attempts (i.e., attempting suicide but surviving) (Kessler et al., 1999), as well as suicide (i.e., suicide attempts that result in death; Wilcox, Conner, & Caine, 2004). Reviews of the suicide literature have estimated that the risk for suicide among individuals with SUDs is five times or greater that of the general population (Wilcox, Conner, & Caine, 2004; Yoshimasu, Kiyohara, & Miyashita, 2008). The identification of psychological and social processes that elevate risk for suicidal thoughts and behaviors (i.e., ideation, attempts, or death) among individuals with substance use disorders (SUDs) represents one avenue for increased understanding of etiological mechanisms, as well as improved prevention efforts.

Several theories of suicide posit a central role for social connectedness in the etiology of suicide. Durkheim's sociological model proposes that too little social integration is one of

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Correspondence concerning this article should be addressed to: Kim Van Orden, Ph.D., University of Rochester Medical Center, Department of Psychiatry, 300 Crittenden Blvd., Box PSYCH, Rochester NY 14642, kimberly\_vanorden@urmc.rochester.edu.

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several dysregulated social forces that causes suicide (Durkheim, 1897), and Shneidman's cubic model of suicide (Shneidman, 1987) proposes that an unmet need for "affiliation" is one of several needs that contribute to suicide when unmet. The interpersonal theory of suicide (Joiner, 2005; Van Orden, Witte, Cukrowicz, Braithwaite, Selby, & Joiner Jr, in press) proposes that the need to belong to caring and supportive relationships (Baumeister & Leary, 1995) is so powerful that, when thwarted, contributes to a desire for suicide. Several studies specifically examining the relationship between belongingness—the degree to which individuals perceive that they are meaningfully connected to satisfying (and positive) relationships or social groups—and suicidal desire have supported the theory (Conner, Britton, Sworts, & Joiner, 2007; Joiner, Hollar, & Van Orden, 2006; Joiner, Van Orden, Witte, Selby, Ribeiro, Lewis, et al., 2009; Van Orden, Witte, Gordon, Bender, & Joiner, 2008; Van Orden, Witte, James, Castro, Gordon, Braithwaite, et al., 2008), although only one report used a substance dependent sample (Conner et al., 2007).

Empirically, indices of social connectedness are related to suicidal thoughts and behavior among individuals with SUDs in several ways. First, living alone is associated with suicide (Murphy, Wetzel, Robins, & McEvoy, 1992) and suicide attempts (Haw, Houston, Townsend, & Hawton, 2001). Second, low social support is associated with suicide attempts (Darke, Ross, Williamson, Mills, Havard, & Teesson, 2007; Johnsson & Fridell, 1997; Kingree, Thompson, & Kaslow, 1999). Third, perceptions of belongingness are also related to a lower likelihood of a past suicide attempt (Conner, Britton, Sworts, & Joiner, 2007).

Given the high degree of interpersonal impairment associated with substance dependence (Segrin, 2001), interpersonal factors may be especially important targets for suicide prevention in substance dependent populations. Indeed, psychological autopsy studies (though uncontrolled) indicate that partner/family relational discord is more common among SUD individuals who died by suicide compared to those with mood or anxiety disorders (Duberstein, Conwell, & Caine, 1993; Heikkinen, Aro, Henriksson, Isometsa, Sarna, Kuoppasalmi, et al., 1994; Rich, Fowler, Fogarty, & Young, 1988). Given the high prevalence of interpersonal problems among individuals with SUDs who die by suicide, the aim of the current study is to examine the relationships between suicidal ideation and attempts with several social connectedness indices simultaneously in order to identify which measure(s) of social connectedness may be especially relevant to suicidality among individuals with SUDs. With few exceptions (Conner et al., 2007; Duberstein et al., 1993; Heikkinen et al., 1994b), studies of suicidal thoughts and behavior have used only a single measure of social connectedness, precluding comparisons among measures.

We used indices of social connectedness across several levels of analysis as proposed by Berkman and colleagues' (2000). At the first level, structural components of the social network were measured by whether participants lived alone, perceived social support and perceived degree of conflict in relationships were measured at an intermediate level, and at the most microlevel, the inner state of thwarted belongingness was measured, which is presumed to reflect an unmet need to belong to meaningful relationships (Baumeister & Leary, 1995). We hypothesized that all indices of social connectedness would be associated with suicidal behaviors such that greater degrees of connection would be associated with reduced probability of a past suicide attempt and suicidal ideation.

## Method

### Procedure

Participants were recruited from four residential substance-use treatment programs in upstate New York. Following brief announcements, participants who were interested in study participation were scheduled for a one-on-one screening session lasting about 30

minutes. All participants completed self-report questionnaires and received a \$10 gift card. A small proportion of participants went on to complete a more in-depth research battery; the present results focus only on the screening data. The study procedures were approved by the institutional review board of University of Rochester Medical Center and University of Buffalo.

## Participants

A total of 814 patients participated in the study. There were 584 men and 228 women, and two participants did not report their gender. The mean age of participants was 39.0 years ( $SD=11.3$ ), and 219 (26.9%) reported having less than 12 years of education. Of the sample, 477 (58.6%) identified themselves as non-Hispanic White, 282 (34.6%) as non-Hispanic Black, 55 (6.8%) as other race/ethnicity. Diagnostic data are not available for the sample, as these data were collected as part of a brief screen.

## Measures

**Outcomes: Suicidal Ideation and Suicide Attempt**—Lifetime attempt was assessed using a question (“Have you ever tried to kill yourself or attempt suicide?”) that shows high test-retest reliability (91.8% agreement,  $\kappa = .82$ ) in substance dependent patients (Conner et al., 2007). Lifetime ideation was assessed using a question from the National Comorbidity Survey (“Have you ever seriously thought about committing suicide?”) (Kessler, Borges, & Walters, 1999). Three mutually exclusive groups included history of suicide attempt, with or without suicidal ideation ( $N = 207$ , 25.4%), no history of suicide attempt but history of suicidal ideation ( $N = 168$ , 20.6%), and no history of ideation or attempts ( $N = 439$ , 53.9%).

For the secondary analyses of attempters, two mutually exclusive subgroups were created using an item from the National Comorbidity Survey with the procedure described by Nock and Kessler (2006) to discriminate suicidal gestures without intent to die (“My attempt was a cry for help, I did not intend to die”) versus suicide attempts with intent (“I tried to kill myself, but knew the method was not foolproof” or “I made a serious attempt to kill myself and it was only luck that I did not succeed”). An item created for the project asking “how did you feel after the attempt?” was used to create two mutually exclusive subgroups of those happy to be alive after the attempt (“100% wanted to be alive” or “Mostly wanted to be alive”) versus those who regretted surviving (“Mostly wanted to be dead” or 100% wanted to be dead.)”

## Assessments of Social Connectedness

The Interpersonal Needs Questionnaire (Van Orden, Witte, Gordon, Bender, & Joiner, 2008) was used to assess *belongingness* with higher scores indicating more belongingness (internal consistency,  $\alpha = 0.81$ ). Participants were asked to rate 10 questions assessing one’s beliefs about the degree to which they feel belong to others on a 7-point Likert scale from *not at all true for me* to *very true for me* ( $\alpha = 0.81$ ). An example item is “These days I am close to other people.” *Perceived social support* was assessed with the Kessler Perceived Social Support scale (KPSS; Kessler, Kendler, Heath, Neale, & Eaves, 1992) with higher scores indicating more social support. The scale asks 1) “How much do the following people listen to you if you need to talk about your worries or problems,” 2) “How much do the following people understand the way you feel and think about things,” and 3) “How much do the following people go out of their way to help you if you really needed it.” Participants rate each question for five different social relationships (spouse, family, friends, religious groups, and neighborhood) on a 4-point Likert scale from *not at all* to *a great deal*, and rate the overall satisfaction on a 6-point Likert scale from *very dissatisfied* to *very satisfied* (“Overall, how satisfied are you with that?”). The sum of all items was used as the overall

level of perceived social support (internal consistency,  $\alpha = 0.93$ ). *Interpersonal Conflict* was measured with the Test of Negative Social Exchange (TENSE; Ruehlman & Karoly, 1991), with higher scores indicating more frequent negative social exchanges including hostility, insensitivity, interference, and ridicule. Participants were asked to rate how often they have experienced such behaviors in the past three months on a 5-point scale from *not at all to about everyday* ( $\alpha = 0.93$ ). To measure *living status*, participants were asked to report their usual living arrangements during the 90 days prior to inpatient admission. We formed three mutually exclusive groups: 1) living alone; 2) living with family (with partner/significant other, with partner and children, with children, with other family); and 3) other living arrangements (incarcerated/jail/prison, homeless, psychiatric unit, inpatient alcohol/drug treatment, and other). Of the sample, 23.8% (N=190) reported living alone; 55.2% (N=440) living with family; and 21.0% (N=167) other living arrangements.

### Assessments of Covariates

Demographic covariates included age, gender, ethnicity (non-Hispanic White, non-Hispanic Black, and other race/ethnicity), and education (< 12 years,  $\geq 12$  years). For *primary substance use*, participants were asked to answer the question of “Which drug, including alcohol, is your primary substance of use?” We formed three mutually exclusive groups based on the primary substance: Alcohol, cocaine, and other. Supporting validity, the item was highly correlated with items asking the drug that caused “the most difficulty” ( $r = .90$ ,  $p = .01$ ) and the drug that was used “most often” in the past year ( $r = .92$ ,  $p = .01$ ). For *breath of drug use*, the numbers of drugs that were used more than 1-2 times per week were calculated to create a continuous variable of the breath of drug use (Conner, Swogger, & Houston, 2009). *Alcohol-related severity* is assessed using the Alcohol Use Disorders Identification Test (AUDIT; Bohn, Babor, & Kranzler, 1995), a 10-item self-report measure of drinking and alcohol-related problems in the past year ( $\alpha = 0.92$ ). Although more often used as a screen, the AUDIT has also been validated for use in clinical substance use populations as a continuous measure of alcohol-related severity (Donovan, Kivlahan, Doyle, Longabaugh, & Greenfield, 2006). The Physicians Health Questionnaire (PHQ; Spitzer, Kroenke, & Williams, 1999) was used to assess the severity of *depressive symptoms*, excluding the suicide item ( $\alpha = 0.87$ ).

### Data analytic strategy

Using multinomial logistic regression models (Hosmer & Lemeshow, 2000), three mutually exclusive, unordered groups of attempt, ideation, and non-suicidal participants were compared. The method of profile likelihood (McCullagh & Nelder, 1989) was used to compute odds ratios and 95% confidence intervals. We first conducted univariate tests for each predictor variable and covariates to compare the ideation and attempt groups with the nonsuicidal reference group. Predictors were perceived social support, belongingness, interpersonal conflict, and living alone. Covariates included gender (Female, reference), age, ethnicity (White, reference), education ( $\geq 12$  years, reference), primary substance use (alcohol, reference), breadth of drug use, alcohol-related problem severity, and depressive symptoms. In multivariate analyses, we simultaneously examined the relationships between indices of social connectedness at different levels of analysis and the outcomes of both suicidal ideation and suicide attempts. Variables that were not significantly associated with either ideation or attempt with  $p > .05$  in a univariate test were removed from the subsequent multivariate test. Finally, in secondary analyses of individuals who had made a suicide attempt, we compared subgroups of attempters with low versus high intent to die, as well as subgroups who were glad to have survived versus wished they had died, on the indices of social connectedness. These analyses explore the extent to which the connectedness variables may differ as a function of these clinically relevant aspects of attempts. If connectedness is more strongly associated with more severe attempts (i.e., suicide intent)

and with a continued longing for death (i.e., wished had died), then it would suggest the importance of a focus on connectedness in the prevention of more serious acts of suicide.

## Results

The majority of the sample was male ( $n = 584$ ; 71.74%) and the average age was 39.0 years ( $SD = 11.3$ ). Most identified as Non-Hispanic white ( $n = 477$ ; 58.6%) or non-Hispanic Black ( $n = 282$ ; 34.6%). The majority of the sample reported at least 12 years of education ( $n = 595$ , 73.1%). Most reported living with family ( $n = 451$ , 55.4%). As seen in Table 1, concerning the covariates, univariate results (odds ratios, 95% confidence intervals,  $p$  values, respectively) indicate that males were significantly less likely to report a past attempt (0.40, 0.28-0.56,  $p < .01$ ) and those with less than 12 years of education were significantly more likely to report both ideation (1.50, 1.01-2.23,  $p < .05$ ) and attempt (1.57, 1.09-2.26,  $p < .05$ ). Neither age nor ethnicity was predictive of ideation or attempt. Both severity of alcohol-related problems and depressive symptoms were significantly related to ideation (AUDIT score 1.02 1.01-1.04,  $p < .05$ ; PHQ-9 score 1.09, 1.06-1.12  $p < .05$ ) and attempt (AUDIT score 1.03, 1.02-1.05,  $p < .05$ ; PHQ-9 score 1.09, 1.06-1.12  $p < .05$ ).

Concerning the predictors of interest, as seen in Table 1, univariate results show that decreased levels of perceived social support (0.98, 0.97-0.99,  $p < .01$ ) and belongingness (0.96, 0.95-0.98,  $p < .01$ ) were associated with greater probability of ideation. Likewise, decreased levels of perceived social support (0.98, 0.96-0.98,  $p < .01$ ) and belongingness (0.97, 0.96-0.98,  $p < .01$ ) were associated with greater probability of attempt. A 1-point decrease on the perceived social support measure increased the probability of having ideation by 2% (1-3%) and attempt by 2% (1-4%); a 1-point decrease on the belongingness measure increased the probability of having ideation by 4% (2-5%) and attempt by 3% (2-4%). Consistently, increased levels of interpersonal conflict were associated with greater probability of ideation (1.03, 1.02-1.05,  $p < .01$ ) and attempt (1.02, 1.01-1.03,  $p < .01$ ). Living alone was associated with greater probability of attempt (1.57, 1.04-2.35,  $p < .05$ ) but was not associated with ideation at a statistically significant level. Finally, none of the social connectedness indices differentiated between subgroups of attempters with a) low versus high intent to die, or b) low versus high regret over surviving, suggesting that the interpersonal variables are relevant to attempts broadly but may not distinguish a more severe subgroup of attempter.

Multivariate results are presented in Table 1. Three variables that were not associated with either ideation or attempt in univariate analyses (age, ethnicity, primary substance of use) were removed from the multivariate analysis. After adjustment, lower levels of belongingness were associated with greater probability of both ideation (0.98, 0.96-1.00,  $p < .05$ ) and attempt (0.98, 0.97-1.00,  $p < .05$ ). Lower levels of perceived social support were associated with greater probability of attempt (0.98, 0.97-0.99,  $p < .01$ ) but not with ideation at a statistically significant level. Individuals living alone were more likely to attempt suicide compared to those living with family (1.74, 1.11-2.72,  $p < .05$ ).

## Discussion

The current study examined the relationships among several indices of social connectedness and lifetime histories of suicidal ideation and suicide attempt among individuals in residential substance-use treatment programs. In line with predictions, all indices of social connectedness—interpersonal conflict, low perceived social support, low belongingness, and living alone—were associated with an increased probability of a history of suicide attempt and history of ideation (with the exception of living alone which was associated with attempt only). In the multivariate model with all indices of social connectedness included, as

well as covariates, interpersonal conflict and belongingness were significant predictors of a history of suicidal ideation, and belongingness, perceived social support, and living alone were significant predictors of suicide attempt. Thus, among individuals with SUDs, indices of current social connectedness at several levels of analyses are associated with lifetime histories of suicidal ideation and attempt. Future research could examine whether these indices may function as indicators of on-going elevated risk for suicidality. Finally, we found the most consistent support for the relationship between suicidal ideation and suicide attempts and belongingness, which is the form of social connectedness posited by the interpersonal theory of suicide to be a key factor in desire for suicide. Thus, our results provide additional empirical support for the theory and its applicability to patients treated for SUDs (Conner, Britton, Sworts, & Joiner, 2007).

Our findings should be considered within the context of the study's limitations. Suicidal ideation and attempts were measured retrospectively, thus precluding an examination of temporal and causal relations. Further, associations between social connectedness and current suicidality were not analyzed and it is possible that some measures of social connectedness may display different relations with current suicidality. Other sources of heterogeneity of suicide attempts were not available, for example data on the number of past attempts were not available, thus precluding an examination of whether indices of social connectedness function differently for multiple versus single attempters. We do not have diagnostic data for these participants, thus precluding analyses examining whether diagnostic categories function as either distal contributors to—or consequences of—social disconnection, thereby exploring one mechanism whereby mental disorders may elevate risk for suicide. Our sample consisted of adults receiving treatment at residential SUD treatment programs, thus caution must be taken when generalizing these findings beyond this high-risk population. An assessment of burdensomeness, the other key interpersonal predictor in the interpersonal theory, is not available.

Regarding clinical implications, the single item question measuring whether or not participants lived alone is a quickly and easily administered index of social connectedness and our data suggest that it is reliably associated with a history of a past attempt. Research is needed to investigate mechanisms whereby living alone confers risk; in the meantime, we suggest that clinicians working with SUD patients should routinely inquire about living status and take into consideration living alone in their suicidal behavior risk formulations. The measure of belongingness (Van Orden et al., 2008), a straightforward 10-item self-report scale, could also be administered and scored rapidly as part of a risk assessment. Future studies could investigate whether interventions for SUDs that specifically target patients' connectedness, particularly belongingness, reduce the risk for suicidal behavior.

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**Table 1**  
Univariate and Multivariate Results of Multi-nominal Regression Models Predicting Lifetime Suicide Ideation and Attempt

Variable	Univariate Results			Multivariate Results		
	Ideation		Attempt	Ideation		Attempt
	OR	95% CI	OR	95% CI	OR	95% CI
<b>Demographic Variables</b>						
Male	1.11	0.72, 1.70	0.40**	0.28, 0.56	1.03	0.64, 1.64
Female	1.00		1.00		1.00	
Age	1.00	0.98, 1.01	1.00	0.99, 1.02	-	-
Black, non-Hispanic	1.19	0.83, 1.70	1.06	0.68, 1.65	-	-
Other race/ethnicity	0.81	0.43, 1.54	0.72	0.32, 1.65	-	-
White, non-Hispanic	1.00		1.00		-	-
Education < 12 years	1.50*	1.01, 2.23	1.57*	1.09, 2.26	1.56*	1.03, 2.39
Education ≥ 12 years	1.00				1.00	
<b>Substance Use/Depression</b>						
Primary substance cocaine	1.31	0.86, 2.00	1.21	0.82, 1.77	-	-
Primary substance other	1.37	0.87, 2.15	0.97	0.63, 1.49	-	-
Primary substance alcohol	1.00		1.00		-	-
Breadth of Drug Use	1.16*	1.02, 1.31	1.19*	1.05, 1.34	1.02	0.89, 1.17
AUDIT score	1.02*	1.01, 1.04	1.03*	1.02, 1.05	1.01	0.99, 1.03
PHQ-9 score <sup>a</sup>	1.09*	1.06, 1.12	1.09*	1.06, 1.12	1.05**	1.02, 1.09
<b>Social Connectedness</b>						
Belongingness	0.96**	0.95, 0.98	0.97**	0.96, 0.98	0.98*	0.96, 1.00
Perceived social support	0.98**	0.97, 0.99	0.98**	0.96, 0.99	0.99	0.98, 1.01
Interpersonal Conflict	1.03**	1.02, 1.05	1.02**	1.01, 1.03	1.02**	1.01, 1.04
Living Status						
Living alone	1.33	0.86, 2.05	1.57*	1.04, 2.35	1.40	0.88, 2.22
Other living arrangements <sup>b</sup>	1.44	0.91, 2.29	2.17**	1.44, 3.29	1.26	0.77, 2.06

Variable	Univariate Results			Multivariate Results		
	Ideation		Attempt	Ideation		Attempt
	OR	95% CI	OR	95% CI	OR	95% CI
Living with family <sup>c</sup>	1.00		1.00		1.00	

Note. Individuals with lifetime suicide ideation without attempt (Ideation; N=168) and those with suicide attempt (Attempt; N=207) are each compared with non-suicidal participants (N=439); OR = odds ratio; CI = confidence interval; AUDIT = Alcohol Use Disorders Identification Test; PHQ-9 = Physicians Health Questionnaire;

<sup>a</sup>PHQ-9 score was calculated without one suicide item;

<sup>b</sup>Incarcerated/Jail/Prison, Homeless, Psychiatric unit, Inpatient alcohol/drug treatment, and other;

<sup>c</sup>Living with partner/significant other, living with partner and children, living with children, living with other family.

\* p<.05.

\*\* p<.01.