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Family Network Satisfaction Moderates Treatment Effects among Homeless Youth Experiencing Suicidal Ideation

Qiong Wu¹, Jing Zhang², Laura Walsh³, Natasha Slesnick³

¹Department of Family and Child Sciences, College of Human Sciences, Florida State University. Address: 322 Sandels Building, 120 Convocation Way, Tallahassee, FL 32306

²Department of Human Development and Family Studies, School of Lifespan Development and Educational Sciences, Kent State University. Address: 406G White Hall, 150 Terrace Drive, P.O. Box 5190, Kent, OH 44242

³Department of Human Sciences, College of Education and Human Ecology, The Ohio State University. Address: Campbell Hall Room 135, 1787 Neil Ave., Columbus, OH 43210

Abstract

Objective.—Limited research has evaluated the efficacy of suicide prevention interventions among homeless youth, especially considering how their connectedness with their family would impact treatment outcomes.

Method.—Suicidal homeless youth ($N = 150$) between the ages of 18 to 24 years were recruited from a local drop-in center. Youth were randomly assigned to Cognitive Therapy for Suicide Prevention (CTSP) + Treatment as Usual (TAU) or Treatment as Usual alone. Youth reported their family network satisfaction at the baseline assessment, whereas their suicidal ideation, perceived burdensomeness and thwarted belongingness were assessed at baseline and three additional times during a nine-month period.

Results.—A multiple-group autoregressive cross-lagged model suggests that CTSP was associated with lower suicidal ideation and lower thwarted belongingness only among those with high family network satisfaction. Among both groups, perceived burdensomeness predicted higher suicidal ideation, which in turn predicted lower perceived burdensomeness and thwarted belongingness. Additionally, only among youth with low family network satisfaction, thwarted belongingness predicted lower suicidal ideation.

Correspondence concerning this article should be addressed to Qiong Wu, Department of Family and Child Sciences, College of Human Sciences, Florida State University. Address: 322 Sandels Building, 120 Convocation Way, Tallahassee, FL 32306. qwu3@fsu.edu.

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The authors declare that they have no conflict of interest.

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Declaration of interest

All the authors declare no conflict of interest.

Conclusions.—Findings suggest that family network satisfaction may be an important factor when considering cognitive interventions with homeless youth, with implications to improve treatment efforts and to reduce premature mortality, hospitalization and loss of human capital in a very high-risk population.

Keywords

suicidal ideation; homeless youth; cognitive therapy; perceived burdensomeness; thwarted belongingness; the interpersonal-psychological theory of suicide

High rates of suicidal behaviors are reported among homeless youth, with research showing that up to 68% of homeless youth report a lifetime suicide attempt (Rotheram-Borus & Milburn, 2004; Yoder, Whitbeck, & Hoyt, 2010). To improve suicide prevention and treatment for homeless youth, it is critical to understand risk factors and mechanisms associated with suicide risk among this population. The interpersonal-psychological theory of suicide (Joiner, 2005; Van Orden et al., 2010) proposes that perceived burdensomeness and thwarted belongingness are two proximal risk factors that precede suicidal ideation. Yet very limited empirical research has tested how these two core constructs are associated with suicidal ideation among homeless youth. Furthermore, no prior studies have tested the effectiveness of cognitive therapy in affecting the pathways connecting perceived burdensomeness and thwarted belongingness with suicidal ideation.

Considering the vulnerability of this high-risk population, relationships with family members may be essential in remission of suicidal ideation and interruption of suicidal behaviors (Miller, Esposito-Smythers, & Leichtweis, 2015). Limited attention has been directed to whether family network satisfaction influences suicidal ideation and outcome of suicide treatment, which is crucial in understanding the development and prevention of suicidality among homeless youth. Guided by the interpersonal-psychological theory of suicide, the current study examined the moderation effects of family network satisfaction on the treatment effectiveness of cognitive therapy, as well as on the prospective associations among perceived burdensomeness, thwarted belongingness, and suicide ideation among a sample of homeless youth.

Perceived Burdensomeness, Thwarted Belongingness, and Suicidal Ideation

The interpersonal-psychological theory of suicide proposes that the desire for suicide results from the simultaneous presence of two interpersonal factors: perceived burdensomeness and thwarted belongingness (Joiner, 2005; Van Orden et al., 2010). Perceived burdensomeness describes the perception that one's life burdens family members, friends, and/or society; whereas thwarted belongingness describes feelings of social alienation and absence of reciprocal care. Research has provided evidence that the combination of high perceived burdensomeness and high thwarted belongingness is especially pernicious for suicidal ideation (Van Orden, Witte, Gordon, Bender, & Joiner, 2008; Wong, Koo, Tran, Chiu, & Mok, 2011). An emerging body of research examining independent effects of these two interpersonal states suggests that perceived burdensomeness serves as a stronger predictor of

suicidal ideation than thwarted belongingness (Chu et al., 2018; Hollingsworth et al., 2017; see Ma, Batterham, Caele, & Han, 2016, for a review). For instance, Chu and colleagues (2018) examined perceived burdensomeness and thwarted belongingness as explanatory variables of suicide risk in five samples including undergraduate students, homeless individuals, primary care patients, and military service members. The researchers found that perceived burdensomeness was a more robust predictor of suicidal ideation and future likelihood of suicidal behaviors compared to thwarted belongingness.

Cognitive Therapy for Suicide Prevention (CTSP) (Wenzel, Brown, & Beck, 2009) has shown effectiveness in reducing suicidal behaviors among both adults (Brown et al., 2005) and youth (Stanley et al., 2009). Yet, little is known how CTSP may affect perceived burdensomeness and thwarted belongingness, and associated suicidal ideation. Joiner (2005) proposes that perceived burdensomeness is a cognitive distortion caused by individuals' attribution of their social incompetence. Van Orden and colleagues (2012) further posit that perceived burdensomeness and thwarted belongingness are "dynamic and amenable to therapeutic change" (p. 198). In this light, cognitive therapy may be used to help individuals generate reasonable appraisals and alleviate negative interpersonal states, and subsequently reduce their desire for death. With a sample of 80 adolescents aged 13 to 19 years, Hill and Pettit (2019) conducted a randomized clinical trial to test the effectiveness of a web-based selective preventive suicide intervention drawing on the principle of cognitive-behavioral therapy. The researchers found that participants who completed the intervention exhibited significantly lower perceived burdensomeness and thwarted belongingness compared to those in the control condition at the follow-up assessment. Based on these theoretical tenets and empirical evidence, CTSP may reduce perceived burdensomeness, thwarted belongingness, and suicidal ideation among homeless youth, similar to housed youth.

Upon a review of studies testing the interpersonal theory of suicide, researchers have found mixed evidence regarding the theory, with the association between perceived burdensomeness and suicide ideation being the most robust finding (Chu et al., 2017; Ma et al., 2016). The mixed findings have several possible explanations. First, most studies examining the interpersonal theory of suicide only adopted a cross-sectional design or a one-time follow-up design (see Chu et al., 2017 and Ma et al., 2016 for reviews), without assessing the associations among perceived burdensomeness, thwarted belongingness and suicidal ideation across multiple time points (e.g., more than three times). As individual's cognition is a dynamic changing process that is susceptible to the influences of internal factors (e.g., other cognitive, emotional, and psychiatric states) and external causes (e.g., therapeutic interventions), understanding the longitudinal relations between one's cognition and suicidal ideation is important. This is especially true in the context of evaluating the efficacy of treatment, as longitudinal evidence with multiple assessments provides valuable information in tracking the changes over time, as well as unpacking the multifaceted relations among these variables.

Second, albeit the predictive associations between perceived burdensomeness and thwarted belongingness and suicidal ideation, no study has examined if suicidal ideation also predicts perceived burdensomeness and thwarted belongingness. Preliminary evidence suggests that psychiatric disorders generally associated with social withdrawal or potential liability to

others (i.e., mood disorders and social phobia) are positively associated with thwarted belongingness and perceived burdensomeness (Davidson, Wingate, Grant, Judah, & Mills, 2011; Silva, Ribeiro, & Joiner, 2015). As the comorbidity between suicidal ideation and depression and social anxiety is high (Eisenberg, Gollust, Golberstein, & Hefner, 2007), it is likely that suicidal ideation contributes to future thwarted belongingness and perceived burdensomeness, contributing to an ever-lasting potentiating loop for cognitive distortions and risk behaviors.

Finally, the inconsistent findings of previous studies may reveal a lack of consideration of other stressors that can affect or moderate the relations between the two interpersonal factors (perceived burdensomeness and thwarted belongingness) and suicidal ideation. Individual's risk factors (including perceived burdensomeness and thwarted belongingness) can increase the risk of suicidality, with the weakest, most vulnerable factors interacting with stressors to contribute to suicidal thoughts and behaviors (Kleiman, Riskind, Stange, Hamilton, & Alloy, 2014). These stressors may include individual's health, acquired capability to attempt suicide, as well as social relationship satisfaction (Ma et al., 2016), which is another focus of the current study.

Moderating Effects of Family Network Satisfaction

Network satisfaction, defined as individual's satisfaction about the quality of one's social relationships as well as feelings of being supported and cared about, is considered to be among the most potent contributing factors in suicide research, and continues to receive great research attention (King & Merchant, 2008). Individuals with psychiatric disorders are more likely to disclose their suicidal thoughts if they feel satisfied with and supported by their social network members (Fulginiti, Pahwa, Frey, Rice, & Brekke, 2016). Researchers have explored the relations between three domains of belongingness (family, peer, and academic institution) and suicide ideation among undergraduates, finding that family belongingness was the only domain that significantly contributed to suicide ideation (Ploskonka & Servaty-Seib, 2015). Both cross-sectional and longitudinal studies conducted with clinical and community samples have provided evidence to support the significant role of family connectedness in adolescent suicidal attempts and behaviors (Miller et al., 2015).

Compared with their housed peers, homeless youth generally have negative experiences with family relationships. Homeless youth usually run away from home because of family violence, substance use, and family conflicts (Johnson, Whitbeck, & Hoyt, 2005). Despite the prevailing belief that homeless youth have little family contact and their social networks are mainly made up of transient peer connections, research indicates that many homeless youth report family connections, and furthermore, receive instrumental and emotional supports from parents and family members (De la Haye et al., 2012; Johnson et al., 2005). As research indicates low levels of family cohesion and high levels of family conflicts are associated with poor treatment adherence for suicide treatment (Boergers & Spirito, 2003), high levels of family network satisfaction are likely to strengthen the treatment outcomes among homeless youth.

Researchers have proposed to understand suicidality through a diathesis-stress framework (e.g., Blankstein, Lumley, & Crawford, 2007; Chang, Sanna, Hirsch, & Jeglic, 2010; Kleiman et al., 2014), which may shed light on how to conceptualize the risk of suicidality among homeless youth. They suggested that one individual's most severe vulnerability factor(s) would interact with stressor(s) in predicting suicidal thoughts and behaviors. In the case of the current study, the two interpersonal factors, perceived burdensomeness and thwarted belongingness, are vulnerability factors that youth experiencing suicidal ideation exhibit, whereas one of the biggest stressors is their relationships with family members, which is a typical reason why they had left home (Rew, 2000). According to Kleiman and colleague (2014), when both stressors (i.e., low family satisfaction) and vulnerability factors (i.e., perceived burdensomeness and thwarted belongingness) are present, individuals experience the greatest risk for suicide. The diathesis-stress approach suggests a possible path that family network satisfaction moderates the associations between perceived burdensomeness/thwarted belongingness and suicidal ideation, with implications for how we conceptualize the risk for suicide in this homeless, vulnerable population.

Supporting this, although research has not tested this diathesis-stress view of suicidality among homeless youth, prior research has shown family relationship can moderate vulnerability factors in predicting suicide risk, among samples in a similar age range (i.e., adolescents to young adults). These studies include: among adolescents, family cohesion mitigated the risk of suicide predicted by depression (Au, Lau, & Lee, 2009); pressure from family members intensified the link between interpersonal factors and suicidal ideation among undergraduate students (Wang, Wong, & Fu, 2013); family connectedness reduced the risk in school and peer relationships in predicting adolescent suicide risk (Kidd et al., 2006). More importantly, a family-based intervention reduced suicidal behaviors only among Hispanic adolescents with low levels of parent-adolescent communication (Vidot et al., 2016). Musci and colleagues (2018) call for more research to understand moderators in youth suicide prevention studies, to shed light on risk and protective factors in youth suicidality as well as the heterogeneity of treatment effects.

The Current Study

The current study is a secondary analysis of a randomized controlled trial of Cognitive Therapy for Suicidal Prevention (CTSP) among a sample of homeless youth experiencing suicidal ideation. In the major outcome analysis, youth showed a faster decline in suicidal ideation in the group receiving CTSP added on to treatment as usual, compared to youth in the treatment-as-usual (TAU) group (Slesnick et al., in press). Responding to a call to understand heterogeneous treatment effects in youth suicide prevention studies (Musci et al., 2018), the current study provides additional information regarding how family network satisfaction moderates the treatment effects of CTSP, as well as the prospective associations among perceived burdensomeness, thwarted belongingness, and suicidal ideation.

A sample of homeless youth was recruited from the only local drop-in center for homeless youth in a large Midwestern city. Homeless youth were randomly assigned to the treatment group (CTSP added on to TAU) or to the control group (TAU only), while their perceived burdensomeness, thwarted belongingness, and suicidal ideation were assessed four times

during a 9-month period (baseline as well as 3-month, 6-month, and 9-month follow-up assessments). We controlled for the effects of concurrent depressive symptoms in understanding the associations between interpersonal factors (perceived burdensomeness and thwarted belongingness) and suicidal ideation, beyond the effects of depressive symptoms. We also controlled for demographic factors such as youth's age, gender, race, the number of people living at home, monthly income, relationship status, and maternal education, as these factors have been associated with homeless youth's mental health (e.g., Cleverley & Kidd, 2011; Edidin, Ganim, Hunter, & Karnik, 2012). To understand the effects of family network satisfaction on the changes of perceived burdensomeness, thwarted belongingness, and suicidal ideation over time, we also tested the moderation effects on the stability paths (from the previous time point to the next one) of these variables.

We hypothesized that family network satisfaction would enhance the treatment effects of CTSP. That is, among youth with high family network satisfaction, the associations between CTSP and lowered perceived burdensomeness, thwarted belongingness, and suicidal ideation, were expected to be stronger compared to those with low family network satisfaction. Second, we hypothesized that family network satisfaction would moderate the reciprocal, prospective relations between interpersonal factors (perceived burdensomeness and thwarted belongingness) and suicidal ideation. Given a diathesis-stress approach (Blankstein et al., 2007; Kleiman et al., 2014), we expected a stronger association between thwarted belongingness and suicidal ideation, and between perceived burdensomeness and suicidal ideation, among youth with low family network satisfaction, compared to those having high family network satisfaction.

Method

Participants

Homeless youth ($N = 150$) were recruited from the only drop-in center for homeless youth in a large Midwestern city, as part of a larger study. Eligible participants were between the ages of 18 to 24 years, were currently homeless, were able to provide informed consent as determined by the Structured Clinical Interview for DSM-5 disorders psychotic screening (SCID; First, Williams, Karg, & Spitzer, 2015), and reported one or more episodes of severe suicidal ideation in the past 90 days. Scoring 16 or higher on the Scale for Suicide Ideation-Worst Point (SSI-W; Beck, Brown, & Steer, 1997) is associated with a 14-fold higher chance of completing suicide (Beck, Brown, Steer, Dahlsgaard, & Grisham, 1999). For the purposes of this study, youth had to complete the Social Network Interview (Stein, Rappaport, & Seidman, 1995). Eight youth had incomplete data, and so were removed from the study, resulting in a final sample of $N = 142$. Table 1 presents a summary of demographic variables for the sample.

Procedure

Youth were approached at the drop-in center and screened for interest in the study and suicidal ideation by a research assistant. Interested youth with current suicidal ideation reviewed and signed an informed consent statement and were administered the SCID section on psychosis and the SSI-W to determine formal eligibility. Individuals who met the criteria

for participation continued with the assessment battery. Youth who were ineligible were provided a care package with toiletries and food items, and continued to receive treatment as usual through the drop-in center. Youth determined to be at imminent risk for suicide were accompanied to a local hospital for crisis assessment and/or psychiatric evaluation. Upon completion of the baseline assessment, youth were randomly assigned using a computerized randomization program to either CTSP+TAU ($n = 73$) or TAU ($n = 69$). An intent-to-treat design was used in which all youth, regardless of participation, were tracked for follow-up assessments. Follow-up assessments occurred at 3-months (T1, retention rate 89.4%), 6-months (T2, 86.6%), and 9-months (T3, 85.9%) post-baseline. Participants received a \$40 Walmart gift card at the completion of each assessment. All research procedures were approved by the university's Institutional Review Board.

Intervention

Cognitive Therapy for Suicide Prevention (CTSP; Wenzel et al., 2009) is an innovative therapeutic approach that primarily targets suicidal behavior, and has shown promising results for adults and youth (Brown et al., 2005; Stanley et al., 2009; Wenzel et al., 2009). CTSP aims to address and change maladaptive cognitions associated with suicidal ideation and targeted vulnerability factors such as homelessness, social isolation, poor problem solving, and compromised impulse control (Slesnick et al., in press). Treatment is designed as a 10-session protocol with 9 optional maintenance sessions completed within the first six months of study participation. CTSP helps youth develop a crisis plan, educates youth, and helps them build coping skills and promotes positive cognitive and behavioral changes. Youth are supported in building and/or strengthening their social network, and skills-building is used to help prevent relapses in suicidal ideation. More detailed information can be found in Slesnick and colleagues' (in press) manuscript.

Treatment as usual (TAU) consisted of non-directive, client-centered therapy, which is the standard suicide prevention practice. All services are provided at Columbus, Ohio's only drop-in center for homeless youth. The drop-in center provides services to meet youths' basic needs, recreational activities, and linkage to community resources as needed. Unlike CTSP, TAU services are unsystematic and not manualized.

Differences between groups were assessed using independent-sample t-tests. Youth who were assigned to TAU reported a significantly higher number of people living in their home growing up compared to youth in CTSP ($t(137) = 2.65, p = .009$) at baseline. No other significant differences were found between groups at baseline. On average, youth in the CTSP group attended 6.13 ($SD = 7.91$) total sessions with an average of 2.78 ($SD = 3.55$) being CTSP sessions, with 10.1% youth completed all CTSP sessions (Table 1). The number of attended sessions was not associated with baseline variables other than group assignment; youth in the CTSP condition attended significantly more therapy sessions in the first 6 months compared to their TAU peers ($t(140) = 2.54, p = .01$).

Intervention fidelity was assessed using the Cognitive Therapy Rating Scale (CTRS; Young & Beck, 1980), which is an 11-item scale used to assess therapist fidelity and scored on a 7-point scale. Two therapists received CTSP training and weekly supervision with audiotape reviews. The offsite supervisor, Amy Wenzel, rated 53 sessions for therapist "a" and 36

sessions for therapist “b.” Scores ranged from 20 to 41 for therapist “a” ($M = 31.17$, $SD = 5.54$) and from 13 to 42 for therapist “b” ($M = 32.26$, $SD = 6.59$), indicating satisfactory fidelity for both therapists (Slesnick et al., in press).

Measures

Family network satisfaction was measured using the Social Network Interview (Stein et al., 1995) at baseline. Youths were asked to identify as many as ten family members and then answer questions concerning their relationships with each individual family member. Network satisfaction was coded from the question “how do you feel after asking (your family member) for help?” Responses were rated on a 5-point scale (0 – feel very relieved, 1 – feel somewhat relieved, 2 – feel only a little relieved, 3 – feel no different, 4 – feel worse), reverse coded, and summed across all reported family network members.

Suicidal ideation was measured using the Scale for Suicide Ideation – Worst (SSI-W; Beck et al., 1997) at all four time points. The SSI-W is a 19-item interviewer-administered scale, and measures the intensity of respondents’ specific attitudes, behaviors, and plans to complete suicide during the time they had the most intense desire to complete suicide in the past 90 days. Possible scores range from 0 to 38, with higher scores indicated greater suicidal ideation. The SSI-W has established validity and had shown good internal consistency (Cronbach alpha = .88; Beck et al., 1997). In the current study, reliability of the SSI-W at baseline, 3-, 6-, and 9-months was .69, .89, .86, and .87, respectively.

The Interpersonal Needs Questionnaire (INQ; Van Orden et al., 2008) is a 25-item scale designed to assess *thwarted belongingness* and *perceived burdensomeness*, the two components of suicidal desire as conceptualized by the Interpersonal Psychological Theory of Suicide. Items are rated on a 7-point Likert scale, and the measure has shown high internal consistency (Van Orden et al., 2008). The current study utilized the INQ at all four time points, with alphas ranging from .79 to .88.

Depressive symptoms were assessed using the Beck Depression Inventory II (BDI-II; Beck et al., 1996). The BDI-II is the most frequently used self-report instrument assessing mood, cognitive, and somatic facets of depression, and has been used with adults and adolescents. It has shown high internal consistency, with a coefficient alpha of .86 among psychiatric patients and .81 among non-psychiatric subjects. In the current study, depressive symptoms score was used as a time-varying covariate. Coefficient alphas in the current study were .92 at T2, .92 at T3, and .94 at T4.

Covariates were assessed through a demographic questionnaire, and included the youth’s age, gender (1 = Male, 2 = Female), race (two dummy coded variables, being White vs. nonWhite, and being Black vs. non-Black), the number of people living at home, monthly income, relationship status (0 = single or divorced, 1 = in a relationship or married), and maternal education in years, reported by youth at baseline.

Analytic Plan

The descriptive analysis was conducted with SPSS (version 24; IBM Corp., 2016). Autoregressive cross-lagged models were applied to test the model with the lavaan package

(Rosseel, 2012) in R (R Core Team, 2014). Percentage of missing data ranged from 2.1% to 14.1% (see Table 2). Little's MCAR test (Little, 1988) indicated that data were missing completely at random, $\chi^2(139) = 161.18, p = .10$. Thus, full information maximum likelihood algorithm was employed for missing data estimation as recommended (Enders & Bandalos, 2001). Further, we included the root mean square error of approximation (RMSEA) and the comparative fit index (CFI) as the model fit indexes, with a RMSEA of .05 and below and CFI of .95 and above indicating good fit and a RMSEA of .05-.08 and CFI of .90-.95 indicating acceptable fit (Hu & Bentler, 1995).

First, prospective relations among perceived burdensomeness, thwarted belongingness, and suicidal ideation were tested using an autoregressive cross-lagged model, with suicidal ideation predicting future perceived burdensomeness and thwarted belongingness, as well as perceived burdensomeness and thwarted belongingness predicting suicidal ideation at the next time point. An autoregressive cross-lagged model would enable us to test the prospective, transactional relation among perceived burdensomeness, thwarted belongingness and suicidal ideation. That is, if perceived burdensomeness and thwarted belongingness prospectively predict suicidal ideation, and suicidal ideation in turn predicts future perceived burdensomeness and thwarted belongingness, an ever-lasting cycle of cognitive patterns maintaining suicidal ideation may be created. More importantly, an autoregressive cross-lagged model would allow for testing the time during and after treatment when heterogeneity of treatment effects happened, thus being a recommended approach in intervention research (e.g., Badour, Blonigen, Boden, Feldner, & Bonn-Miller, 2012; Shaffer, Lindhiem, Kolko, & Trentacosta, 2013). Using an intent-to-treat design, a binary variable indicating the intervention groups was used to predict perceived burdensomeness, thwarted belongingness, and suicidal ideation after baseline. Youths' sex, age, race, and maternal years of education were included as covariates, and youths' depressive symptoms score was included as a time-varying covariate, predicting their suicidal ideation at the same time point.

Further, youth were divided into two groups, based on the family network satisfaction score that was coded from their responses during the Social Network Interview at the baseline assessment. A mean-split approach was used to categorize participants into two groups that represented high versus low levels of family network satisfaction, as similarly used in previous research concerning social network and psychiatric symptoms (e.g., Batchelder et al., 2017; Beard et al., 2016; Kidd et al., 2006). Then, multiple-group models were tested within the autoregressive cross-lagged model, to investigate the differences between two family network satisfaction groups. A multiple-group approach is commonly used to test for treatment effect heterogeneity in randomized controlled trials, with explanatory models (i.e., paths set to be equal among groups) nested within the full model (i.e., all paths set to be the different across groups) (Emsley, Dunn, & White, 2010). Two models were estimated, with the target paths (both autoregressive and cross-lagged paths) being set free then fixed to equal between groups. The chi-square test was used to compare the model fits of the two nested models. If the unconstrained model yielded a better model fit than the constrained model, the unconstrained model would be retained, as this indicates the parameter estimates of the paths differed significantly between groups. The final models included freely estimated autoregressive and cross-lagged paths which were statistically different between

groups, while all other autoregressive and cross-lagged paths were set to be equal between groups. Due to our multiple-group approach, we used the Bonferroni adjustment on p-values to reduce the possibility of potential inflated Type-I errors (Li et al., 2016). A significant level of 0.025 (0.05/2) has been applied as a correction in our multiple-group model coefficients (Table 4).

Finally, as the interpersonal-psychological theory of suicide proposes an interaction between perceived burdensomeness and thwarted belongingness in predicting individual's suicidal ideation (Joiner, 2005; Van Orden et al., 2010), we tested this interaction across three time points. None of these interactions were statistically significant, which was found before and was discussed as due to specific sample characteristics (e.g., Cero, Zuromski, Witte, Ribeiro, & Joiner, 2015). Thus, the interaction terms were removed from the final model. Please refer to Figure 1 as the conceptual autoregressive cross-lagged model.

Results

Descriptive statistics and bivariate correlations of the study variables are presented in Table 2. Preliminary analyses using multilevel models showed significant decline over time in the whole sample in suicidal ideation (slope $B = -5.52$, $SE = 0.25$, $t = -21.84$, $p < .001$), perceived burdensomeness (slope $B = -0.26$, $SE = 0.04$, $t = -7.33$, $p < .001$) and thwarted belongingness (slope $B = -0.25$, $SE = 0.04$, $t = -5.96$, $p < .001$), although none of the slopes differed based on family network satisfaction ($ps > .05$). Further, to test the moderating effect of family network satisfaction, a mean split approach resulted in a low family network satisfaction group ($n = 89$) and a high family network satisfaction group ($n = 53$). The final autoregressive cross-lagged model showed an acceptable model fit, $\chi^2(208) = 280.39$, $p = .001$; RMSEA = .070 (CI₉₀ = .047, .090); CFI = .951. Multiple-group tests indicated several significant between-group differences (Table 3).

First, a significant between-group difference was found in the treatment effect on suicidal ideation at T3, $\chi^2(1) = 5.18$, $p = .02$. Among youth with high family network satisfaction, CTSP was associated with lower suicidal ideation at T3 at a trend level ($B = -2.00$, $SE = 0.98$, $t = -2.04$, $p = .04$), whereas this effect was not significant for youth with low family network satisfaction ($B = -0.49$, $SE = 0.75$, $t = -0.65$, $p = .52$). Similarly, a significant between-group difference was found in the treatment effect on thwarted belongingness at T3, $\chi^2(1) = 5.43$, $p = .02$. CTSP was associated with lower thwarted belongingness at T3 among youth with high family network satisfaction ($B = -0.45$, $SE = 0.20$, $t = -2.24$, $p = .03$), but not those with low family network satisfaction ($B = -0.06$, $SE = 0.17$, $t = -0.37$, $p = .71$).

We also found significant between-group differences in the paths of thwarted belongingness predicting future suicidal ideation (from T1 to T2: $\chi^2(1) = 7.35$, $p = .007$; from T2 to T3: $\chi^2(1) = 5.89$, $p = .01$). For youth having low family network satisfaction, thwarted belongingness was associated with lower suicide ideation (from T1 to T2: $B = -0.96$, $SE = 0.51$, $t = -1.87$, $p = .06$; from T2 to T3: $B = -0.96$, $SE = 0.39$, $t = -2.47$, $p = .01$); this effect was not found among youth having high family network satisfaction, in which the link was positive or nonsignificant (from T1 to T2: $B = 2.02$, $SE = 0.70$, $t = 2.89$, $p = .004$; from T2 to

T3: $B = -0.29$, $SE = 0.48$, $t = -0.61$, $p = .54$). In both groups, perceived burdensomeness at T1 predicted suicidal ideation at T2 ($B = 1.66$, $SE = 0.48$, $t = 3.47$, $p = .001$), and suicidal ideation at T3 predicted lower perceived burdensomeness ($B = -0.03$, $SE = 0.01$, $t = -2.47$, $p = .01$) and thwarted belongingness ($B = -0.05$, $SE = 0.02$, $t = -3.28$, $p = .001$) at T4.

Significant between-group differences in autoregressive paths were also found, for suicidal ideation (from T2 to T3, $\chi^2(1) = 4.49$, $p = .03$) and perceived burdensomeness (from T3 to T4, $\chi^2(1) = 9.02$, $p = .003$). For youth having low family network satisfaction, their suicidal ideation at T2 was associated with future suicidal ideation at T3 ($B = 0.71$, $SE = 0.08$, $t = 9.04$, $p < .001$), and more strongly compared with those who have higher family network satisfaction ($B = 0.56$, $SE = 0.11$, $t = 5.13$, $p < .001$). For youth having low family network satisfaction, perceived burdensomeness at T3 was associated with perceived burdensomeness at T4 ($B = 0.38$, $SE = 0.07$, $t = 5.70$, $p < .001$), less strongly compared with those with high family network satisfaction ($B = 0.63$, $SE = 0.10$, $t = 6.63$, $p < .001$). Other autoregressive paths did not yield significant between-group differences, though they all remained stable over time (Table 4).

Finally, to understand the effects of treatment, as well as interpersonal factors, on specific items of the SSI-W, we analyzed item responses using ordinal logistic regressions. Due to limited space of the manuscript, we included this information in the supplemental material.

Discussion

The current study investigated the moderating relations of family network satisfaction on the treatment effects of CTSP, as well as the prospective associations among perceived burdensomeness, thwarted belongingness, and suicidal ideation, among a sample of homeless youth experiencing suicidal ideation. We found evidence suggesting that high family network satisfaction enhanced treatment effects of CTSP regarding suicidal ideation and thwarted belongingness. Moreover, family network satisfaction moderated the relation between thwarted belongingness and suicidal ideation. Findings of the current study have implications to improve theorization of suicidality as well as intervention efforts for this high-risk, vulnerable population.

Consistent with our first hypothesis, youth in the CTSP group reported lower levels of suicidal ideation and thwarted belongingness at T3 only among those with high family satisfaction. Whereas these findings support the efficacy of CTSP among homeless youth in reducing cognitive distortions of social alienation and associated suicidal thoughts, the moderating relation suggests family network satisfaction is a strong protective factor for homeless youth with suicidal ideation. As CTSP requires youth to challenge faulty cognitions, which could include not receiving enough reciprocal care or support from loved ones (Wenzel et al., 2009), satisfying relationships with family members may serve as opposing evidence against these fallacies, which may ultimately help youth reconstruct their core beliefs about worthlessness, reduce feelings of disconnection and alienation, and thus mitigate suicidal tendencies. In the current study, youth in both treatment groups experienced a similar level of reduction in their suicidal thoughts in early treatment (T1 to T2), whereas the heterogeneous treatment effects concerning family network satisfaction

appeared in late treatment (T2 to T3). This indicates that youth with strong family relationships improve faster when treatment reaches a plateau or a bottleneck, possibly showing that youth with better family relationships maintain more motivation to change even when the reduction of symptoms associated with treatment slows down in mid- and late treatment. This finding sheds light on the conceptualization of family relationship as a moderator to heterogeneity in treatment effects.

Consistent with our second hypothesis, family network satisfaction moderated the relationship between thwarted belongingness (at T1 and T2) and suicidal ideation (at T2 and T3, respectively). Among youth having low family network satisfaction, thwarted belongingness predicted lower suicidal ideation, whereas those with high family network satisfaction, positive or nonsignificant relations between these two variables were observed. Although the direction of moderation was not predicted, this observation may be unique considering the characteristics of homeless youth. For youth with low family satisfaction, it is likely that one of their most prominent stressors is their conflictual, violent, or even abusive relationships with family members (Johnson et al., 2005). Thus, when low family network satisfaction is present, feelings of alienation or thwarted belongingness may not have the expected negative impact on those youth, and instead indicates that less connection with family results in healthier outcomes. Conversely, high family network satisfaction may urge homeless youth with higher thwarted belongingness to feel more suicidal, due to the cognitive dissonance in the contrast of perceiving caring family members but also feeling alienated. This effect was only found during treatment but not after (i.e., from T3 to T4), possibly indicating a need to reflect on and process the conflictual family relationships during treatment for youth.

In contrast to the moderating relation of family network satisfaction on the link between thwarted belongingness and suicidal ideation, consistent predictive relations between perceived burdensomeness at T1 and suicidal ideation at T2 were reported, in spite of youth's family network satisfaction. These findings support previous observations that perceived burdensomeness is a more robust predictor of suicidal ideation, compared to thwarted belongingness, across studies utilizing large sample sizes and a wide variety of populations (Chu et al., 2017, 2018; Ma et al., 2016). This effect was only found during the early phase of treatment. It is possible that treatment (including both CTSP and TAU) interrupted the dysfunctional thought path from perceived burdensomeness to suicidal ideation in late- and post-treatment phases, as these two constructs are strongly associated in non-treatment samples, both theoretically (Joiner, 2005) and empirically (Chu et al., 2017, 2018; Ma et al., 2016). As this is one of the first steps to test if treatment can interrupt interpersonal factors in their role of contributing to suicidal ideation, this effect should be replicated in future studies with larger sample sizes and a variety of populations.

Additionally, we found that the stability of suicidal ideation from T2 to T3 was stronger in the low family network satisfaction group than the high satisfaction group. Associated with our observation about the treatment effect of CTSP during the same time frame (i.e., late treatment, T2 to T3) among youth in the high satisfaction group, this finding indicated that youth with more satisfying family relationships had a better chance to reduce their suicidal ideation (for example, if they received CTSP), compared to those with less satisfying family

relationships. These findings suggest that connecting with family members can enhance treatment effects and mitigate the risk of suicidality (Miller et al., 2015). We also found that the stability of perceived burdensomeness from T3 to T4 was stronger in the high family network satisfaction group compared to the low satisfaction group. It is likely that homeless youth, albeit receiving care and support from family members, can perceive themselves as a burden to their family members, friends, and even society. Homelessness commonly results from a mixture of mental health and personality disorders, substance use, conflictual relationships with immediate family members, and financial issues, and the experience of homelessness is filled with daily challenges and traumatic experiences. When facing empathy and concerns from family members, homeless youth may experience self-pity or even self-loathing, contributing to their perceived burdensomeness. This effect was only found during the post-treatment phase, possibly indicating that after treatment, youth with high family satisfaction became sensitive to the love and care of their family members.

Finally, perceived burdensomeness at T1 predicted greater suicidal ideation at T2, and suicidal ideation at T3 predicted lower levels of perceived burdensomeness and thwarted belongingness at T4. No study to date has examined the predictive associations from suicidal ideation to later perceived burdensomeness and thwarted belongingness, though preliminary evidence suggests concurrent relations of mood disorders and social phobia with thwarted belongingness and perceived burdensomeness (Davidson et al., 2011; Silva et al., 2015). A possible explanation for our findings is that suicidal ideation reduces cognitive discomfort resulting from perceived burdensomeness and thwarted belongingness, as life-ending thoughts may take precedence over perceived social connectedness. That is, suicidal thoughts may remove one's attention from interpersonal aspects of life, reducing their perceived impact (Orbach, 2008). Alternatively, suicidal ideation might result in reparation to negative perceptions of burdensomeness and belongingness. Notably these effects were only found in the post-treatment phase, possibly indicating youth's reflection on the interpersonal factors of suicide after treatment. However, future research is needed to examine these hypotheses, as well as to investigate the reciprocal, prospective relations among suicidal ideation, thwarted belongingness and perceived burdensomeness further.

Taken together, these findings suggest family network satisfaction is a core factor in conceptualizing homeless youth's suicidal ideation, and improving intervention efforts targeting suicidal behaviors among homeless youth. Findings partially support the interpersonal-psychological theory of suicide (Joiner, 2005), highlighting the importance of incorporating moderators when seeking to understand the reciprocal, longitudinal associations among suicidal ideation, thwarted belongingness and perceived burdensomeness, as proposed by the diathesis-stress approach (Blankstein et al., 2007; Kleiman et al., 2014). This study responds to a call to understand moderators in youth suicide prevention studies (Musci et al., 2018), with a particular focus on understanding the timing when the heterogeneity of treatment effects have happened. Finally, this study sheds light on the unique challenges that homeless youth face regarding understanding and intervening in their suicidality. Satisfactory family relationships can protect against suicidal ideation, but can also trigger negative experiences associated with homelessness, implying special treatment needs for homeless youth in addressing their cognitive distortions and reconstructing core beliefs associated with suicidality.

Several limitations should be considered when interpreting the findings. First, this study utilized a convenience sample of youth accessing a drop-in center, and these findings may not be generalized to those who do not utilize drop-in centers. Compared to youth not accessing services, these youth might have greater motivation to change their life, and better skills to obtain resources, which may have impacted their suicidality and response to intervention. Second, as the original study was a pilot study testing the efficacy of CTSP, the current study included a relatively small sample size. Although we were able to achieve a power level of 0.79 in the test for close fit (following the procedures as detailed in MacCallum, Browne, & Sugawara, 1996), future studies should use a larger sample size to allow for testing more complicated relations among variables. Moreover, since this study utilized self-report measures, although necessary and useful in suicide research, they can be influenced by social desirability. Future research should consider using alternative measures for suicide, e.g., the implicit association test (Nock et al., 2010). Finally, we measured family network satisfaction using a total score of satisfaction ratings across all reported family members. The experiences of youth can be very different for those having only one but very supportive family member, and those with a number of low-rated family members. Future research should consider both the quantity of family members, and the quality of relationship with each member, when determining family network satisfaction.

Despite these limitations, the current study has notable strengths. This study utilized a randomized controlled trial design and tested a manualized, empirically supported intervention with a very high-risk sample. We assessed participants four times over a nine-month period to measure treatment effects. The current study adds to the evidence base supporting the positive effects of cognitive therapy on homeless youth, also underscoring the importance in considering relational factors when working with this population, responding to a call to understand moderators in youth suicide prevention studies (Musci et al., 2018). Overall, the current study provides evidence for the interpersonal-psychological theory and a diathesis-stress approach in conceptualizing suicidal ideation, as well as improving the evidence-based practices with this vulnerable population. Given the significant risk of suicidality among homeless youth (Yoder et al., 2010), it is crucial to recognize the two-sidedness of their family relationships as influencing their suicidality. Therapists working with homeless youth should consider incorporating components of skills training specifically focused on improving relationship satisfaction with family members, and gaining support through the family network. This study also suggests the potential to use family-based interventions with homeless youth such as Ecologically Based Family Therapy (EBFT, Slesnick & Prestopnik, 2005) and Support to Reunite, Involve and Value Each Other (Milburn et al., 2012), with a focus to improve family relationships, as well as youth's mental health. Finally, this study supports the use of cognitive therapy in reducing suicidal ideation in homeless youth, which can ultimately reduce premature mortality, hospitalization and loss of human capital.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Highlights

- Cognitive Therapy for Suicide Prevention is effective with homeless youth.
- Family network satisfaction is important when considering cognitive interventions.
- Homeless youth face unique challenges associated with their family network.

Figure 1.

The conceptual model.

Note. T1: baseline. T2-T4: 3-month, 6-month, and 9-month follow-up assessments.

Table 1

Demographic Characteristics of the Current Sample

Variables	n (%)	Mean (S.D.)
Age		21.03 (1.96)
Sex		
Female	61 (43.0%)	
Male	81 (57.0%)	
Race/Ethnicity		
American Indian or Alaskan Native	1 (0.7%)	
Asian, Asian-American, or Pacific Islander	1 (0.7%)	
Black or African American	54 (38.0%)	
Hispanic, Other Latin American	2 (1.4%)	
White, not of Hispanic origin	55 (38.7%)	
Other	29 (20.4%)	
Years of education received		11.32 (1.60)
1-5	1 (0.7%)	
6-8	5 (3.5%)	
9-11	29 (38.1%)	
12	67 (47.2%)	
13-16	15 (10.6%)	
Current marital status		
Single, never married	134 (94.4%)	
Legally married	4 (2.8%)	
Divorced	4 (2.8%)	
Number of children		
0	100 (70.4%)	
1	25 (17.6%)	
2 and more	17 (12.0%)	
Child ever taken out of your custody?		
Yes	29 (69.0%)	
Number of lifetime suicide attempts		5.85 (9.62)
Length of homelessness		119.44 (182.70)
CTSP group: number of total sessions		6.13 (7.91)
CTSP sessions		2.78 (3.55)
TAU sessions		2.97 (4.67)
TAU group: numbers of TAU sessions		3.38 (4.68)

Note. Lifetime suicide attempts were assessed using two questions on a self-reported demographic questionnaire at baseline: “have you ever tried to kill yourself, attempt suicide, or have you placed yourself in dangerous or life-threatening situations?” And “how many times in your life have you attempted suicide?”

Table 2

Descriptive Statistics and Correlation among Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1. Treatment																								
2. Race W	-.05																							
3. Race B	.08	-.62***																						
4. Sex	.07	-.11	.14																					
5. Relationship	-.06	.00	-.04	.23**																				
6. Age	.02	.02	.03	-.25***	-.09																			
7. N Home	-.22**	-.07	-.14	.10	.20*	-.10																		
8. M Edu	-.04	.07	-.12	-.26**	-.13	.04	.01																	
9. BDI_T2	-.05	.05	.02	.03	.11	.10	-.12	-.05																
10. BDI_T3	.02	.03	.01	.05	.13	.06	-.12	-.08	.75***															
11. BDI_T4	.08	.16	-.07	-.06	-.07	-.02	-.20*	-.01	.70***	.72***														
12. Fam Net	.03	-.14	.08	.01	.01	-.08	.01	-.04	.03	-.03	-.02													
13. Burden_T1	.05	.13	-.02	.13	.04	-.05	-.04	-.12	.28**	.29***	.29**	.09												
14. Burden_T2	.02	.07	-.01	-.00	-.03	.04	-.05	.01	.55***	.44***	.45***	-.04	.42***											
15. Burden_T3	.06	.08	.09	-.08	-.00	.06	-.13	-.01	.43***	.55***	.34***	-.06	.32***	.65***										
16. Burden_T4	.13	.17	-.04	-.10	-.17	-.05	-.14	.07	.44***	.45***	.58***	-.07	.35***	.73***	.65***									
17. Belong_T1	.06	-.05	.14	.15	-.01	-.12	-.05	-.05	.15	.17	.24**	.07	.52***	.17	.13	.23*								
18. Belong_T2	-.03	-.05	.13	.08	.02	.08	.09	-.06	.50***	.36***	.36***	.05	.25**	.61***	.33***	.41***	.29***							
19. Belong_T3	-.00	-.06	.18*	.02	.00	.02	-.04	.07	.37***	.43***	.31***	.04	.19*	.41***	.63***	.44***	.29**	.71***						
20. Belong_T4	-.02	.03	.04	-.02	-.05	-.04	-.01	-.00	.41***	.39***	.51***	.03	.20*	.50***	.44***	.67***	.34***	.76***	.73***					
21. SSL_T1	.07	.07	-.08	.11	.05	-.06	.04	-.05	.06	.07	-.02	-.09	-.04	.05	-.03	-.07	-.03	-.01	-.05	-.03				
22. SSL_T2	-.06	.17	-.20*	-.06	.11	.06	-.03	.02	.48***	.42***	.34***	-.08	.36***	.47***	.39***	.28**	.14	.34***	.22*	.26**	.22*			
23. SSL_T3	-.11	.18*	-.16	-.11	.09	-.12	-.02	.05	.37***	.46***	.40***	-.14	.29**	.37***	.46***	.26**	.08	.13	.22*	.14	.16	.76***		
24. SSL_T4	-.05	.24**	-.16	-.18*	.00	-.04	-.15	.08	.35***	.40***	.50***	-.15	.29**	.32**	.40***	.37***	.17	.17	.26**	.26**	.05	.65***	.82***	
N	142	142	142	142	142	142	139	124	126	123	122	142	142	127	123	122	142	127	123	122	142	127	123	122
Min	0	0	0	1	0	18	0	6	0	0	0	0	1.53	1.40	1.40	1.40	1	1	1	1	12	0	0	0
Max	1	1	1	2	1	24	25	18	56	56	56	24	6.60	6.60	6.60	6.60	6.5	7	7	7	38	31	25	21

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mean	-	-	-	-	-	21.03	5.35	12.58	20.28	17.40	17.75	3.84	3.93	3.36	3.21	3.21	4.10	3.54	3.41	3.44	22.85	7.12	5.93	5.45
SD	-	-	-	-	-	1.96	2.79	2.50	12.60	12.08	12.69	4.50	1.09	1.12	1.18	1.09	1.16	1.37	1.37	1.38	4.84	6.55	5.65	5.71

Note. Treatment: CTSP+TAU=1, TAU = 0. Race W (race being White): White =1, other races = 0. Race B (race being Black): Black =1, other races = 0. Sex: male = 1, female = 2. Relationship: in a relationship or married = 1, single or divorced = 0. N Home = number of people living at home. M Edu = maternal education. BDI = depressive symptoms. Fam Net = family network satisfaction. Burden = perceived burdensomeness. Belong = thwarted belongingness. SSI: suicidal ideation. T1: baseline. T2-T4: 3-month, 6-month, and 9-month follow-up assessments.

* $p < .05$

** $p < .01$

*** $p < .001$.

Table 3

Chi-Square Tests of Differences in Path Coefficients between Groups

	Suicidal ideation			Thwarted belongingness			Perceived burdensomeness		
	T1->T2	T2->T3	T3->T4	T1->T2	T2->T3	T3->T4	T1->T2	T2->T3	T3->T4
Suicidal ideation	ns	4.49 *	ns	ns	ns	ns	ns	ns	ns
Thwarted belongingness	7.35 ***	5.89 *	ns	ns	ns	ns	--	--	--
Perceived burdensomeness	ns	ns	ns	--	--	--	ns	ns	9.02 **
Treatment	ns	5.18 *	ns	ns	5.43 *	ns	ns	ns	ns

Note.

* $p < .05$ ** $p < .01$.

Chi-square tests were based on a degree of freedom of 1.

Table 4

Coefficient Estimates in the Path Model

Predictors	T2				T3				T4			
	High satisfaction		Low satisfaction		High satisfaction		Low satisfaction		High satisfaction		Low satisfaction	
	β	t	β	t	β	t	β	t	β	t	β	t
SSI	.151	2.238*	.146	2.238*	.691	5.125***	.781	9.038***	.679	7.594***	.641	7.594***
Belong	.303	2.887**	-.183	-1.873	-.068	-0.608	-.227	-2.472*	.081	1.101	.075	1.101
Burden	.285	3.473**	.265	3.473**	.098	1.346	.104	1.346	.000	0.005	.000	0.005
Treatment	-.098	-1.372	-.103	-1.372	-.184	-2.042 [†]	-.042	-0.651	-.053	-0.932	-.047	-0.932
BDI	-.159	-0.879	.602	4.905***	.196	1.218	.184	1.546	.104	0.833	.083	0.890
Race W	.021	0.152	-.072	-0.603	.246	2.130 [†]	.010	0.119	.092	0.919	.059	0.682
Race B	-.252	-1.878	-.039	-0.299	.175	1.400	.054	0.636	-.013	-0.140	.022	0.248
Sex	.039	0.286	-.246	-2.556*	-.133	-1.162	-.026	-0.394	-.16	-1.753	-.069	-0.978
Relationship	.157	1.007	.118	1.317	-.145	-1.120	.087	1.376	.094	0.916	-.005	-0.067
Age	.245	1.884	-.082	-0.871	-.386	-3.772***	-.027	-0.427	.002	0.026	.026	0.392
N Home	.215	1.259	.001	1.317	-.064	-0.465	.026	0.354	-.293	-2.347*	-.008	-0.067
M Edu	.467	2.388*	-.057	-0.574	-.178	-1.084	.044	0.638	-.119	-0.873	-.102	-1.391
Belong	-.085	-1.180	-.072	-1.18	-.096	-1.317	-.087	-1.317	-.207	-3.277**	-.207	-3.277**
Treatment	.036	0.469	.033	0.469	-.164	-2.238*	-.022	-0.370	-.022	-0.395	-.020	-0.395
BDI	.520	3.364**	.611	5.086***	.019	0.136	.013	0.115	.401	4.575***	.530	6.874***
Race W	-.140	-0.986	.143	1.154	-.018	-0.162	.121	1.236	-.096	-0.873	.088	0.973
Race B	.172	1.245	.122	0.923	-.020	-0.192	.152	1.519	-.036	-0.355	.041	0.433
Sex	.142	1.040	.027	0.264	.207	1.997 [†]	-.096	-1.240	-.060	-0.579	-.002	-0.029
Relationship	-.196	-1.273	-.074	-0.785	-.067	-0.551	.028	0.379	.001	0.005	-.008	-0.113
Age	.143	1.122	.061	0.616	.093	0.931	-.043	-0.586	-.126	-1.299	-.013	-0.191
N Home	.138	0.826	.180	1.762	.388	2.401*	-.177	-2.272*	-.087	-0.678	.192	2.591*

Predictors	T2				T3				T4			
	High satisfaction		Low satisfaction		High satisfaction		Low satisfaction		High satisfaction		Low satisfaction	
	β	t	β	t	β	t	β	t	β	t	β	t
M Edu	-.147	-0.787	-.057	-0.538	.673	4.774***	.146	1.681	-.144	-0.960	.060	0.795
Burden												
SSI	-.045	-0.065	-.036	-0.650	.124	1.505	.101	1.505	-.192	-2.471*	-.169	-2.471*
Burden	.349	5.082***	.271	5.082***	.579	10.169***	.564	10.169***	.735	6.630***	.424	5.703***
Treatment	.087	1.223	.077	1.223	-.046	-0.758	-.039	-0.758	.080	1.239	.066	1.239
BDI	.140	0.872	.588	5.306***	.289	2.392*	-.055	-0.417	.248	2.885**	.55	6.435***
Race W	-.167	-1.275	.034	0.288	.088	0.862	.156	1.532	-.024	-0.226	.117	1.142
Race B	.055	0.437	-.085	-0.690	.332	3.481***	.188	1.806	-.099	-0.982	-.002	-0.020
Sex	.030	0.239	.017	0.178	.073	0.760	-.103	-1.303	-.071	-0.731	.005	0.060
Relationship	-.389	-2.752*	.007	0.085	-.212	-1.978 [†]	-.016	-0.214	-.127	-1.254	-.036	-0.453
Age	.173	1.475	-.054	-0.584	-.106	-1.200	.014	0.189	-.067	-0.731	-.079	-1.019
N Home	.105	0.677	-.046	-0.481	.084	0.683	-.171	-2.13 [†]	.130	1.070	.010	0.121
M Edu	-.102	-0.580	.108	1.067	.091	0.683	.045	0.513	.100	0.759	.121	1.411

Note. Among the predictors, suicidal ideation, perceived burdensomeness, and thwarted belongingness were measured at the previous time point of the outcome variables, depressive symptoms were measured concurrently, whereas all other demographic covariates were reported at baseline. Treatment: CTSP+TAU=1, TAU = 0. Race W (race being White); White = 1, other races = 0. Race B (race being Black); Black = 1, other races = 0. Sex: male = 1, female = 2. Relationship: in a relationship or married = 1, single or divorced = 0. N Home = number of people living at home. M Edu = maternal education. BDI = concurrent depressive symptoms. Burden = perceived burdensomeness. Belong = thwarted belongingness. SSI: suicidal ideation. T1: baseline. T2-T4: 3-month, 6-month, and 9-month follow-up assessments. R^2 for SSI-high satisfaction group: .364, .646, .744 for T2, T3, T4, respectively; low satisfaction group: .405, .723, .701 for T2, T3, T4, respectively. R^2 for thwarted belongingness-high satisfaction group: .396, .737, .660 for T2, T3, T4, respectively; low satisfaction group: .354, .583, .713 for T2, T3, T4, respectively. R^2 for perceived burdensomeness-high satisfaction group: .385, .717, .731 for T2, T3, T4, respectively; low satisfaction group: .453, .357, .624 for T2, T3, T4, respectively.

[†] $p < .05$

* $p < .025$

** $p < .005$

*** $p < .0005$.