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Loneliness as a Mediator for College Students' Social Skills and Experiences of Depression and Anxiety

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Abstract

Introduction—Rates of anxiety and depression are increasing among college undergraduates. Existing research has demonstrated a link between social skills and mental health outcomes. This study explores the relationship between verbal social skills (encoding and decoding) and anxiety and depression by measuring the extent to which loneliness mediates these relationships.

Methods—Baseline data from a cross-sequential study exploring college student mental health was used to analyze social skills, loneliness, as well as, depression and anxiety. A diverse group of students (n = 2,054; M = 19.95; SD = 1.26) participated from two residential colleges in the United States.

Results—Six mediation models were estimated, separately testing whether loneliness mediated the relationship between anxiety and depression and social expressiveness, sensitivity, and control. All six found that (a) anxiety and depression were separately predicted by the verbal encoding skills of social expressivity and social control and the decoding skill of social sensitivity, and (b) all of those relationships were mediated by loneliness. These models accounted for 37–38% of the variability in scores of depression and 17–20% of the variability in scores of anxiety.

Conclusions—The results of this study indicate verbal social skills play an important role in students experience of loneliness as well as depression and anxiety. Improving the social skills of students should be considered by colleges seeking to reduce the mental health burdens experienced by their students.

Keywords

college students; depression; anxiety; loneliness; social skills

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Introduction

Colleges are reporting ongoing and dramatic increases in the number of students seeking mental health services, particularly for depression and anxiety (Kruisselbrink-Flatt, 2013; Pedrelli, Nyer, Yeung, Zulauf, & Wilens, 2015; Prince, 2015). For adolescents transitioning into emerging adulthood this period of development is known to be one of heightened susceptibility to experiences of loneliness (Qualter et al., 2015). Navigating new academic expectations and social contexts requires adept use of social skills that vary dramatically among students. In this paper we explore the relationship between social skills, depression and anxiety, specifically by exploring the mediating relation of loneliness between social skills and mental health outcomes.

Increased Mental Health Burden

Finding ways to reduce the mental health burdens, particularly depression and anxiety, among college students has become increasingly important. Over the past decade there has been a significant increase in the mental health burden amongst college students, with researchers referring to college student mental health as a crisis (Kruisselbrink-Flatt, 2013; Xiao et al., 2017). Data from the American College Health Association's National College Health Assessment (ACHA-NCHA, 2009; 2017), college counseling centers (Gallagher, 2006; 2010; 2014) and individual college campuses (Beiter et al., 2015; Zivin, Eisenberg, Gollust, & Golberstein, 2009) all indicate high and, in many cases, increasing rates of depression and anxiety. Gallagher (2014) found that directors of college counseling centers ($N = 275$) were reporting large increases in rates of anxiety disorders and clinical depression over the previous five years. As colleges continue to work to treat students with mental health burdens, the research community continues to explore opportunities to better understand the etiology and opportunities to prevent mental health burdens in this population (Buchanan, 2012; Conley, Shapiro, Kirsch, & Durlak, 2017; Levin, Hayes, Pistorello, & Seeley, 2016).

For many traditional college age students, their experience in college coincides with important developmental milestones. The maturation from adolescence into emerging adulthood coincides with the development of multiple identities (Chickering & Reisser, 1993; Jones, 2013) and the balancing of autonomy and relatedness (Erikson, 1968; Ratelle, Simard, & Guay, 2013) that is a hallmark of young adulthood. For students in college, these developmental tasks occur in new and often challenging contexts. Students are expected to navigate demanding academic workloads while developing relationships with peers and forming new social networks. While much attention is paid to the beginning of this transition, particularly the challenges experienced by first year students (Bruffaerts et al., 2018; Wouters et al., 2013) the challenges continue beyond the first year. Aldiabat, Matani, & Navenec, (2014) argue that college students experience dual transitional stressors, transitioning to college while also transitioning from adolescence into adulthood. While the first-year stressors can add to mental health burdens, Beiter et al., (2015) found fourth year students had even higher rates of mental health burdens. This period of multiple transitions for many students is marked by the onset of depression and anxiety (Ibrahim, Kelly, Adams, & Glazebrook, 2013; Mortier et al., 2017; Price, McLeod, Gleich, & Hand, 2006).

Loneliness

For many students, the transition to college provides an ideal context to meet their development needs for greater autonomy from family while creating opportunities for more sophisticated relationships with peers. However, not all students develop the meaningful relationships they desire in college. For some students the experience of college includes a deep sense of loneliness. Peplau and Perlman's (1982) cognitive discrepancy model defines loneliness as a cognitive discrepancy between desired and experienced social relationships. This model may be a particularly useful one for evaluating the experience of loneliness among college students, particularly since the experience of loneliness is not necessarily tied to social isolation (Richardson, Elliott, & Roberts, 2017). The cognitive discrepancy model helps to explain how loneliness can be present and problematic for students surrounded by peers on a college campus. Students can experience high levels of social contact but still feel lonely due to cognitive discrepancies between the desired quality of relationship and actual experiences (Hawkley, Burleson, Berntson, & Cacioppo, 2003; Richardson et al., 2017). Laursen & Hartl (2013) note that in the seminal work on adolescents conducted by Larson, Csikszentmihalyi & Graef (1982), time spent alone was not predictive of an adolescent's experiences of loneliness; however, being alone on a weekend evening was most predictive of reported loneliness. Instead, it is the quality of the social contact and the match or mismatch with desired relationships, not the quantity of relationships that are most useful for understanding loneliness (Lodder, Scholte, Goossens, & Verhagen, 2017; Masi, Chen, Hawkley, & Cacioppo, 2011)

Loneliness and Mental Health

People who experience loneliness are more likely to experience a range of negative mental health outcomes including increased symptoms of depression and anxiety(Cacioppo, Grippo, London, Goossens, & Cacioppo, 2015). While loneliness is a reasonably common phenomenon that is experienced across the lifespan, the meaning and subjective experience of loneliness varies considerably by age (Nicolaisen & Thorsen, 2017; Rokach & Brock, 1997), with adolescents being particularly vulnerable to experiencing problematic or distressing loneliness (Danneel, Maes, Vanhalst, Bijttebier, & Goossens, 2018), in part due to the increasingly complex social behaviors with peers (Jones, Vaterlaus, Jackson, & Morrill, 2014; Lerner & Steinberg, 2004), enhanced social-cognitive and perspective taking skills (Choudhury, Blakemore, & Charman, 2006; Vetter, Leipold, Kliegel, Phillips, & Altgassen, 2013), and the interpersonal challenges associated with navigating the competing desires for autonomy and relatedness (Laursen & Hartl, 2013). Some adolescence and young adults experience an increased level of shame associated with loneliness – an internalization of a stigmatized message that there is something wrong with them if they are feeling lonely (Rokach, 2013; Rokach & Brock, 1997).

Existing research has demonstrated a strong connection between college students' experience of loneliness and depression and anxiety (Richardson et al., 2017). In their study exploring mediators of loneliness on depression in college students Zawadzki, Graham, & Gerin, (2013) note rumination is a significant mediator, adding to the evidence of a cognitive discrepancy basis of loneliness. Others note that social self-efficacy is an important predictor of loneliness (Esen, Aktas, & Tuncer, 2013) and can mediate the relation between loneliness

and depression for college students (Wei, Russell, & Zakalik, 2005). College students who experience shame related to their loneliness may be less likely to engage or enhance social skills to reduce the experience of loneliness. Additionally, there is reason to believe via longitudinal evidence that loneliness is a contributing factor to experiences of anxiety over time (Lim, Rodebaugh, Zyphur, & Gleeson, 2016).

Mental Health and Social Skills

The verbal and non-verbal social skills individuals utilize to cultivate, maintain and strengthen relationships have been demonstrated to be associated with mental health outcomes. Poor social skills are associated with higher rates of loneliness (Ozben, 2013; Panayiotou, Panteli, & Theodorou, 2016), anxiety (Caballo, Salazar, Irurtia, Olivares, & Olivares, 2014; de Lijster et al., 2018) and depression (Pereira-Lima & Loureiro, 2015; Segrin, 2000).

A key differentiator between college students who experience mental health challenges and those who do not may be associated with their social skills. With age, adolescents increasingly are able to further develop and employ social skills to create relationships with peers that are marked by higher levels of intimacy (Danneel et al., 2018). The ability to use social supports effectively and form relationships that help individuals who are experiencing distress reduce negative mental health outcomes has been articulated by the social skills deficit vulnerability model (Segrin, 2000; Segrin, McNelis, & Swiatkowski, 2016). The model has been tested in longitudinal studies of college students, demonstrating students' with lower social skills were more likely to experience depression and loneliness during their transition to college (Segrin & Flora, 2000; Segrin et al., 2016). The effectiveness of an individuals' ability to utilize social supports to deal with stressors, has a strong impact on the resulting mental health outcomes.

A gap in the research exists with regard to an understanding of how specific social skills may influence mental health outcomes, particularly in relation to experiences of loneliness. Based on the gaps in the research literature pertaining to social skills, loneliness and the mental health challenges of depression and anxiety, we seek to better understand potential opportunities for promoting college student mental health.

The current study utilizes baseline data from a cross-sequential study of college student mental health to test the following hypotheses: 1) The social skills of social expressivity and social control will be negatively correlated with report of more intense symptoms of depression and anxiety; 2) The social skill of social sensitivity will be positively correlated with depressive and anxious symptoms; 3) The relation between social expressivity and social control with depression and anxiety will be mediated by loneliness, such that higher scores of social expressivity and social control will result in lower scores of loneliness, which will in turn be related to lower scores on measures of symptoms of depression and anxiety; 4) The relation between social sensitivity and depressive symptoms will be mediated by loneliness, with students who have higher levels of social sensitivity experiencing more intense loneliness, and increased symptoms of depression and anxiety.

Methods

Study Design

Data for this article comes from a cross-sequential study exploring mental health trajectories among undergraduate college students. Data collection occurred during a two-week period in 2018 at two residential liberal arts colleges in the Northeast United States. Students at each school received an email invitation with a unique link to a Qualtrics™ survey along with a request to participate in the study. All enrolled undergraduate students (a total of 4,301) were contacted via email and 2,255 students participated for a response rate of 52.43%. Students who completed the survey were offered the chance to be entered into a raffle to win Amazon gift cards valued at either $50 or $100. The Institutional Review Board at the primary author's institution approved the study protocol.

Participant Characteristics

Participants who did not complete all measures presented in this analysis (n = 201) were eliminated from the data set, leaving a final analytic data set of N = 2,054. Analyses were run to determine if there were significant differences in demographic or other variables of interest between completers and non-completers, with no significant differences. Approximately 60% of the sample was female, year in college was closely distributed among class years, and approximately 30% of participants identified as racial/ethnic minorities. Demographics are presented in full in Table 1. Compared to the profile of the two colleges, our sample overrepresents women, and Latino students, all other demographics match the college profiles.

Measures

Demographic characteristics.—Participants were asked to self-report their race/ethnicity, gender, age, sexual orientation, and perceived socioeconomic status.

Loneliness.—The UCLA Loneliness Scale (v. 3) (Russell, 1996) was utilized to measure loneliness. The measure has 20 items with a response set ranging from never (1) to always (4). Items include statements such as, "How often do you feel that you lack companionship?" as well as, "How often do you feel alone?" The measure was found to be highly reliable, with a Cronbach's Alpha of .94. Sum scores were computed for this measure.

Depression and Anxiety.—The short-form version of the Depression Anxiety Stress Scales (DASS-21) (Henry & Crawford, 2005) was used to measure symptoms of depression and anxiety. Participants read 14 statements (seven for depression and seven for anxiety) and indicate over the past week how much each of those statements applied to them. A four-point set of answer choices were available ranging from "Did not apply to me at all" (0) to "Applied to me very much, or most of the time (3). Examples of the depression items include, "I found it difficult to work up the initiative to do things" as well as, "I felt that I had nothing to look forward to." Items measuring anxiety include, "I was worried about situations in which I might panic and make a fool of myself", as well as, "I felt scared without any good reason." Sum scores were created for both depression and anxiety. Both

subscales used in this analysis (depression and anxiety) had acceptable internal reliability. The depression subscale had a Cronbach's alpha of .91 and the anxiety subscale had a .82.

Social Skills Inventory.—An abridged version of the 90 Social Skills Inventory (SSI) (R. E. Riggio, 1986) was used. For this analysis we focus on the verbal encoding and decoding social skills of social control (SC), social expressivity (SE) and social sensitivity (SS), which were validated by Oldmeadow, Quinn, & Kowert, (2013) as an abridged version of the SSI. Each social skill was measure utilizing four items on a five-point scale ranging from "Not at all like me" (1) to "Exactly like me" (5). Riggio (1986) describes SC as an ability to regulate verbal behaviors and adjust how one presents themselves based on social contexts. Social expressivity measures the verbal ability to initiate conversation, engage others in social interactions with verbal interactions (Riggio, 1986). Finally, SS measures verbal decoding, with individuals scoring high in SS may be hyper vigilant in their decoding, and overly focused on cues about their behavior and how it they are perceived by others (Riggio, 1986). Examples of each subscale include: SC, "I am often chosen to be the leader of a group," SE, "At parties I enjoy talking to a lot of different people," and SS, "I am very sensitive of criticism" (Oldmeadow et al., 2013). The three sub scales were deemed reliable with Cronbach's alphas of .80 for SC, .92 for SE and .86 for SS.

Analysis

Six mediation models were tested. Since no manipulation was used and these data are cross-sectional, all of these models are measurement-of-mediation models. These models tested whether the relationship between each of the three social skills constructs and anxiety and depression was mediated by loneliness. Covariates theoretically expected to be associated with either social skills, anxiety, or depression were included, and were dummy coded. Year in school was dummy coded, with first year set as the reference category, and three separate dummy variables coded for second, third, and fourth year. Each of the coefficients reported (below) for those dummy variables can be interpreted as the difference between the reference category (first year) and the specific category. The significance value can be interpreted as a test of whether the difference between the reference category and the category of interest is significantly different than zero. Dummy coding was used for year in school (as opposed to treating year as a continuous measure) because we did not have theoretical support for the idea that there was a continuous pattern of change across time in college.

Similarly, gender and race were also dummy coded, with man as the reference category (against woman and other gender identity) and White as the reference category (against Latinx, Black, Asian, more than one, and other racial identity). Consistent with Hayes (2017), significance values for the c-c' path are not reported, but 95% confidence intervals are. All confidence intervals are based on 5,000 bootstrap samples and were constructed with a percentile approach. All mediation models were estimated using PROCESS 3.1 (Hayes, 2017).

Results

Bivariate correlations were examined for depression, anxiety and loneliness with the three social skills. The social skills of expressivity and control were both negatively correlated with depression, anxiety and loneliness, while social sensitivity was positively correlated with the three variables. A correlation matrix with means and standard deviations is presented in Table 2.

Loneliness Mediates the Relationships Between Social Skills and Anxiety

As Figure 1 illustrates and Table 3 enumerate, the relationship between social expressivity and anxiety was mediated by loneliness. Participants higher in social expressivity reported lower levels of loneliness ($a = -1.05$, $p < .001$), and those higher in loneliness reported higher levels of anxiety ($b = 0.28$, $p < .001$). The complete model accounted for 17% of the variability in anxiety ($R^2 = .19$). While there was no evidence found that social expressivity had a direct effect on anxiety ($c' = 0.06$, $p = .15$), the bootstrapped confidence interval for the indirect effect ($ab = -0.30$) was entirely below zero (−0.35 to −0.25). That suggests that higher levels of social expressivity were associated with lower levels of loneliness, which in turn was associated with lower levels of anxiety.

Further, the relationship between social sensitivity and anxiety was mediated by loneliness. See Figure 2 and Table 4. Participants higher in social sensitivity reported higher levels of loneliness ($a = 0.57$, $p < .001$), and those higher in loneliness reported higher levels of anxiety ($b = 0.25$, $p < .001$). The complete model accounted for 21% of the variability in anxiety ($R^2 = .21$). In addition to the direct effect that social sensitivity had on anxiety ($c' = 0.33$, $p < .001$), the bootstrapped confidence interval for the indirect effect ($ab = 0.14$) was entirely above zero (0.11 to 0.19). That suggests that higher levels of social sensitivity were both directly associated with higher levels of anxiety, and also related to higher levels of loneliness, which in turn was also related to higher levels of anxiety.

The relationship between social control and anxiety was mediated by loneliness. See Figure 3 and Table 5. Participants higher in social control reported lower levels of loneliness ($a = -0.78$, $p < .001$), and those higher in loneliness reported higher levels of anxiety ($b = 0.27$, $p < .001$). The complete model accounted for 19% of the variability in anxiety ($R^2 = .19$). While there was no evidence found that social control had a direct effect on anxiety ($c' = -0.08$, $p = .07$), the bootstrapped confidence interval for the indirect effect ($ab = -0.21$) was entirely below zero (−0.25 to −0.17). That suggests that higher levels of social control were associated with lower levels of loneliness, which in turn was associated with lower levels of anxiety.

The covariates included in the model showed a relatively consistent pattern, with students identifying as women or as another gender identity being consistently higher in anxiety (in all model), and students who identify as Black being higher in two out of three models, with the coefficient falling just short of significance for the model including social control. Participants identifying as Latinx had higher anxiety only for the model including social sensitivity.

Loneliness Mediates the Relationship Between Social Skills and Depression

As Figure 4 illustrates and Table 6 enumerates, the relationship between social expressivity and depression was mediated by loneliness. Participants higher in social expressivity reported lower levels of loneliness ($a = -1.05$, $p < .001$), and those higher in loneliness reported higher levels of depression ($b = 0.50$, $p < .001$). The complete model accounted for 38% of the variability in depression ($R^2 = .38$). While there was no evidence found that social expressivity had a direct effect on depression ($c' = 0.00$, $p = .91$), the bootstrapped confidence interval for the indirect effect ($ab = -0.52$) was entirely below zero (−0.59 to −0.46). That suggests that higher levels of social expressivity were associated with lower levels of loneliness, which in turn was associated with lower levels of depression.

Further, the relationship between social sensitivity and depression was mediated by loneliness, presented in Figure 5. Participants higher in social sensitivity reported higher levels of loneliness ($a = 0.57$, $p < .001$), and those higher in loneliness reported higher levels of depression ($b = 0.48$, $p < .001$). The complete model accounted for 40% of the variability in depression ($R^2 = .40$). In addition to the direct effect that social sensitivity had on depression ($c' = 0.28$, $p < .001$), the bootstrapped confidence interval for the indirect effect ($ab = 0.27$) was entirely above zero (0.20 to 0.34). That suggests that higher levels of social sensitivity were both directly associated with higher levels of depression, and also related to higher levels of loneliness, which in turn was also related to higher levels of depression.

The relationship between social control and depression was mediated by loneliness presented in Figure 6. Participants higher in social control reported lower levels of loneliness ($a = -0.78$, $p < .001$), and those higher in loneliness reported higher levels of depression ($b = 0.49$, $p < .001$). The complete model accounted for 39% of the variability in depression ($R^2 = .39$). In addition to the direct effect that social control had on depression ($c' = 0.11$, $p < .05$), the bootstrapped confidence interval for the indirect effect ($ab = -0.38$) was entirely below zero (−0.46 to −0.31). That suggests that higher levels of social control were both directly associated with lower levels of depression, and also related to lower levels of loneliness, which in turn was also related to lower levels of depression.

As with the models predicting anxiety, the covariates in the models predicting depression were similarly relatively consistent. Identifying as a gender other than man or woman was consistently associated with more depressive symptoms, as was identifying as Latinx. Identifying as Black was significantly associated with more depression only when modeling the effect of Social Sensitivity.

Discussion

Students' reported experiences of loneliness strongly mediated the relations between the two encoding social skills of social expressivity and social control with the mental health outcome of anxiety. Social expressivity skills involve being more able to initiate conversations and better engage others (Riggio, 1986), and the ability to engage others is an important skill to have in order to reduce the experience of loneliness (Cacioppo et al., 2015) and increase happiness and self-esteem (Panchal & Joshi, 2013). In the language of the cognitive discrepancy model of loneliness, the ability to initiate social contact (social

expressivity) results in reduced discrepancy between desired and experienced social relationships – less loneliness and, these results show, lower levels of depressive and anxious symptoms.

A similar effect may be occurring with the variable of social control. Greater social control skills mean greater ability to (a) navigate a wide range of social contexts, and (b) adjust their self-presentation. This signals both a social sophistication and an ability to adapt to the cultural norms in a particular context (Riggio, 1986) and similar to social expressivity is associated with greater levels of happiness (Panchal & Joshi, 2013). For both social expressiveness and social control, the direct relationship to symptoms of anxiety drops to near zero when loneliness is included as a mediator, suggesting that most of the effect that social expressiveness and social control have on anxiety is mediated by loneliness.

Students who had higher scores in social sensitivity experienced greater levels of both loneliness and anxious symptoms when compared to those with lower scores in this particular skill. This may be due to a decoding bias which leads them to be more egocentric, and potentially view social interactions more negatively and with more anxiety (Knowles, Lucas, Baumeister, & Gardner, 2015; Riggio, 1986). The direct path between social sensitivity and anxiety remains meaningful even when the mediated path is estimated, which suggests that loneliness only accounts for some of the mechanism of action. Social sensitivity has been demonstrated to be associated with higher rates of social anxiety and self-consciousness (Somerville, 2013; Strahan, 2003), as well as more less positive relationships with others (Knowles et al., 2015).

All three models testing loneliness as a mediator in the relationship between all three social skills (encoding skills, or social expressivity and social control; and the decoding skill of social sensitivity) and symptoms of depression were found to predict a significant amount of the overall variability. Models predicted between 38% and 39% of the depressive symptoms observed. The *c*’ path (the direct path) was accounted for a significant amount of variability in depression for social sensitivity and social control but not social expressivity. That is, while loneliness accounted for virtually all the effect that social expressivity had on depression, for social sensitivity and social control, some of the effect was accounted for via the indirect path through loneliness, and some of the effect was accounted for by the direct relationship between social sensitivity and social control on depression.

This relationship between social sensitivity and elevated symptoms of depression can be understood in a number of ways, although due to the cross-sectional nature of the data, we are unable to ascertain the causal relations between these variables. However, one reasonable interpretation of the data is that students who engage in higher rates of socially sensitive decoding experience increased loneliness, which in turn is associated with more depressive symptoms. Considering depression is associated with poor executive functioning (Cacioppo & Hawkley, 2009; Cotrena, Branco, Shansis, & Fonseca, 2016), it could be that the impaired executive function is itself associated with a negative bias in the decoding of social information (Henry, von Hippel, Molenberghs, Lee, & Sachdev, 2016; Masi et al., 2011), resulting in experiences of loneliness. Combined, this may mean that higher levels of social sensitivity may lead to greater experiences of loneliness as individuals are more likely to

negatively encode social signals and withdraw from social settings. That is, individuals who are higher in social sensitivity may find their hyper awareness of other's views of them inhibit their engagement in social interactions (Knowles et al., 2015; Riggio & Kwong, 2009).

Others have argued that the connection between loneliness and depression is mediated by rumination (Zawadzki et al., 2013), with the experience of rumination *and* depression leading to impairments in executive functioning (Snyder, 2013; Watkins & Brown, 2002). Additionally, it is possible that individuals who are high in social sensitivity are dispositionally more prone to loneliness, through some as of yet unexplored shared etiology, whether through greater expectations of social connection or a reduced ability to meet those expectations. Those higher levels of loneliness then lead to more intense depressive symptomology. Research exploring the directionality of loneliness and depression among college students has found loneliness increased rates of depression over time (Richardson et al., 2017), which supports the causal direction implied by our model. However, other work in adult and young adult populations has found a bidirectional relationship between depression and loneliness (Cacioppo, Hughes, Waite, Hawkley, & Thisted, 2006; Matthews et al., 2016). Additional research is needed to better understand the relations between loneliness and depression among adolescence and emerging adults.

The two social encoding variables both had negative relationships with loneliness, indicating those students high in social expressivity and social control experienced lower rates of loneliness. Similar to the direct effects on loneliness discussed with the models predicting anxiety, these two encoding skills offer an opportunity for individuals to better align their desire for relationships with their lived experiences.

Of the two verbal encoding variables, only social control had a direct effect on depression after the mediating influence of loneliness was included. It is plausible that individuals who have lower levels of social control believe they are less able to reduce their experiences of loneliness which contributes to depression. Existing research highlights the role of self-efficacy and depression, noting that those individuals who have lower levels of self-efficacy are more prone to experience depression (Maciejewski, Prigerson, & Mazure, 2000; Soysa & Wilcomb, 2015). It is equally possible that experiencing depression influences an individual's ability to adapt and regulate their self-presentation as depressive symptoms reduce the ability to utilize social-cognitive skills; the current data is not sufficient to make that distinction.

Finally, the direct effects of social skills on loneliness observed in all of the mediation models offer an opportunity to further consider a means of reducing loneliness on college campuses. Colleges struggling with the mental health crisis may find that addressing students' experiences of loneliness begins to lower rates of depression and anxiety. The specific types of programs that would be appropriate at a college campus are currently unclear. It may be possible to include greater social emotional learning in residential programming; however, that is likely only going to have an impact on the minority of students who live on college campuses and are exposed to those programming efforts. Further efforts to destigmatize the experiences of loneliness on college campuses, and

provide interventions specifically aimed at helping students experiencing loneliness may be more efficacious and reach a larger proportion of students experiencing depression and anxiety. The data from this study begins to offer a path to reducing loneliness among college students by considering opportunities to enhance the development and use of students' social skills.

Limitations

There are a number of limitations with the current study. The data for this article represents first wave cross-sectional data from a larger cross-sequential study of college student mental health. Thus, disentangling causal relations among our variables is not possible. The results of this study indicate it may be worth exploring longitudinally the directionality of these relationships. As a current controversy exists with the directionality of loneliness with depression and anxiety, it is also not clear at least in college age students whether social skills are causally involved as a protective or risk factor related to loneliness and depression and anxiety.

Conclusions

Preventative efforts are likely going to be needed to address the increasing mental health crisis on college campuses. The data from this study offer evidence that there is a strong social component to the mental health challenges students are experiencing. Our data supports the social skills deficit vulnerability model (Segrin et al., 2016) by demonstrating lower levels of social skills are associated with higher rates of loneliness and loneliness is positively correlated with depression and anxiety. Students coming to college arrive with a wide variety of social skills and therefore differ in their ability to adapt to the social demands in the college context. Experiences of loneliness in college are not uncommon (Asher & Weeks, 2013), however, for some students they lack the social skills to develop strong relationships and reduce experiences of loneliness. A more focused effort on developing social skills programs to reduce experiences of loneliness are warranted. The findings of this research lend support to the idea of reducing mental health burdens by focusing on reducing students' experiences of loneliness. The findings from this study provide evidence of the link between social skills and loneliness, offering colleges an opportunity to consider developing and implementing programming that explicitly seeks to improve their students' social skills.

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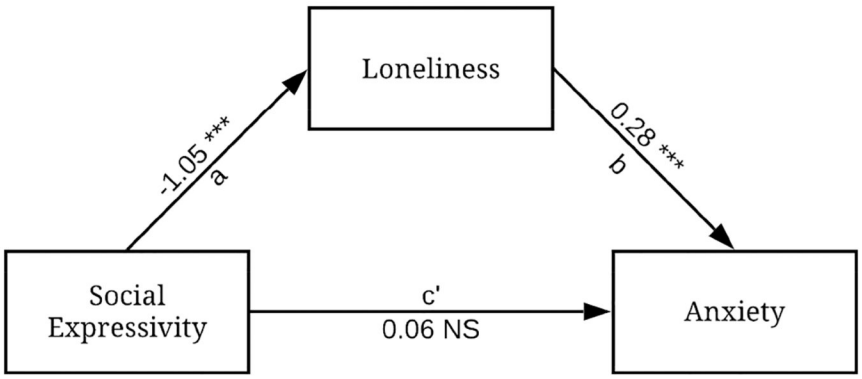

Figure 1.
Mediation of the relationship between social expressivity and anxiety by loneliness.

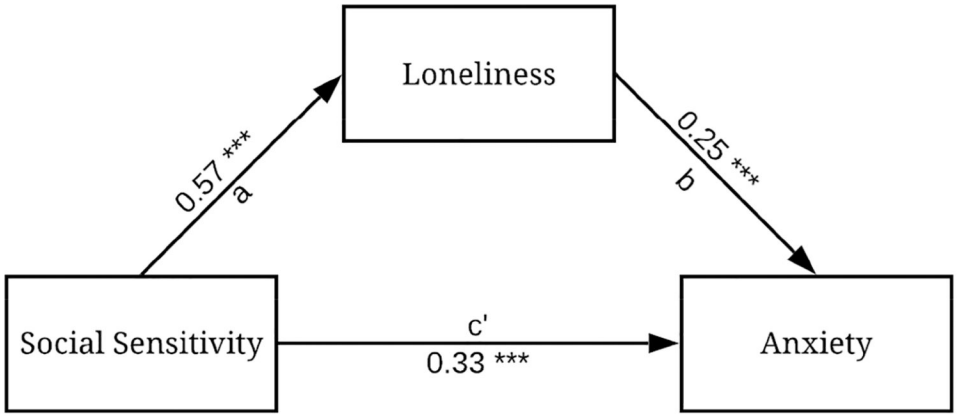

Figure 2.
Mediation of the relationship between social sensitivity and anxiety by loneliness.

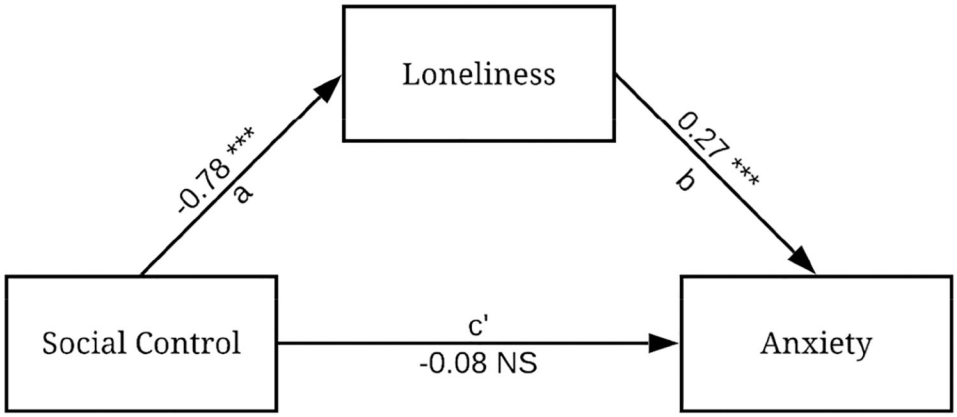

Figure 3. Mediation of the relationship between social control and anxiety by loneliness.

Notes. *p < .05; **p < .01; ***p < .001 Covariates modeled: race/ethnicity, gender, and year in college (all dummy coded). See Tables 3 through 6 for covariate values.

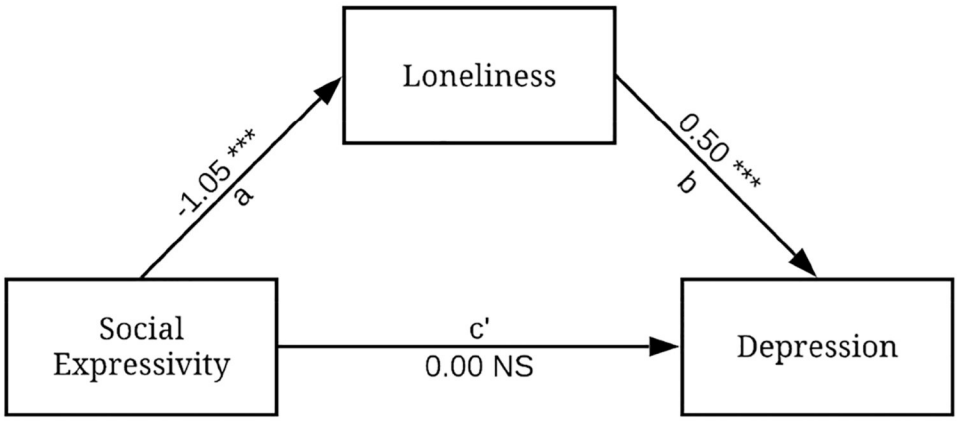

Figure 4.
Mediation of the relationship between social expressivity and depression by loneliness.

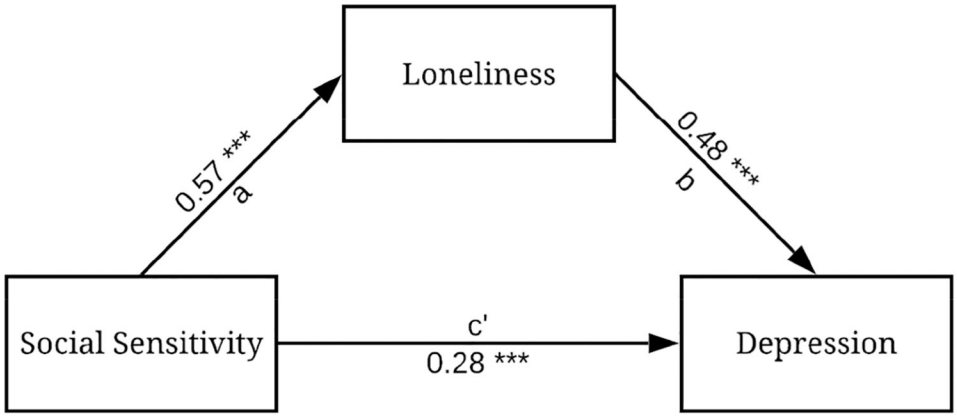

Figure 5.
Mediation of the relationship between social sensitivity and depression by loneliness.

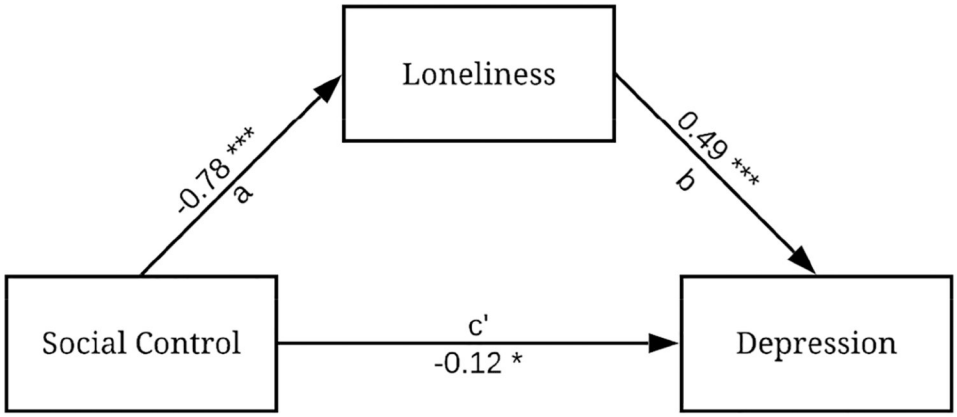

Figure 6. Mediation of the relationship between social control and depression by loneliness.

Notes. *p < .05; **p < .01; ***p < .001. Covariates modeled: Race/Ethnicity, Gender, and Year in College (all dummy coded). See Tables 3 through 6 for covariate values.

Table 1

Participant demographics N = 2,054

Variable	n	%	*M (SD)*
Age			19.95 (126)
Gender			
Female	1,189	57.9	
Male	817	39.8	
Other	47	2.3	
Race/Ethnicity			
Black	82	4.0	
Latino	193	9.4	
White	1,444	70.3	
API	181	8.8	
Mixed	47	2.3	
Other	98	4.8	
Missing	9	0.4	
Sexual Orientation			
Heterosexual	1,642	79.9	
Gay/Lesbian	96	4.7	
Bisexual	153	7.4	
Other	163	7.9	
Perceived SES			
Lower	224	10.9	
Middle	1,031	50.2	
Upper	798	38.9	
Missing	1	0	
Year in college			
First	526	25.6	
Second	551	26.8	
Third	458	22.3	
Fourth	519	25.3	

Table 2

Correlation Matrix

		1	2	3	4	5	6
1	Depression		.60**	.62**	−.25**	−.20**	.20**
2	Anxiety			.41**	−.15**	−.14**	.23**
3	Loneliness				−.41**	−.27**	.15**
4	Social Expressivity					.41**	.06**
5	Social Control						−.03
6	Social Sensitivity						
	Mean	9.09	7.03	42.38	12.47	12.51	13.93
	Standard Deviation	9.37	7.63	11.53	4.33	3.61	3.71

Notes.

* $p > .05$,

** $p > .01$

Table 3

Loneliness Mediates the Relationship Between Social Expressivity and Anxiety

Regression path	*B*	*t*	*P*	LLCI	ULCI
a path (Social Expressivity to Loneliness)	−1.05	−19.71	< .001	−1.16	0.95
b path (Loneliness to Anxiety)	0.28	19.13	< .001	0.25	0.31
c path (total effect of Social Expressivity on Anxiety)	−0.24	1.45	< .001	−0.32	−0.27
c′ path (direct effect of Social Expressivity on Anxiety)	0.06	1.45	0.15	−0.02	0.13
c - c′ path (indirect effect of Social Expressivity on Anxiety)	−0.30			−0.35	−0.25
Covariates					
Year in school					
First year	Reference category				
Second year	0.82	1.78	0.07	−0.08	1.71
Third year	0.67	1.39	0.17	−0.28	1.61
Fourth year	0.37	0.79	0.43	−0.55	1.28
Gender					
Man	Reference category				
Woman	1.55	4.54	< .001	0.88	2.22
Other gender identity	5.83	5.03	< .001	3.55	8.1
Race / ethnicity					
White	Reference category				
Latinx	0.51	0.89	0.37	−0.61	1.64
Black	1.75	2.05	0.04	0.08	3.43
Asian	0.23	0.39	0.70	−0.93	1.39
More than one	−0.37	−0.33	0.74	−2.54	1.8
Other racial identity	0.54	0.68	0.5	−1.01	2.09

Notes. Coefficients for covariates are from the Total Effects model. Total effects R^2 = .19, $F(12, 2019) = 39.67$, $p < .001$

Table 4

Loneliness Mediates the Relationship Between Social Sensitivity and Anxiety

Regression path	*B*	*t*	*P*	LLCI	ULCI
a path (Social Sensitivity to Loneliness)	0.57	8.34	< .001	0.43	0.70
b path (Loneliness to Anxiety)	0.25	18.76	< .001	0.23	0.28
c path (total effect of Social Sensitivity on Anxiety)	0.48	10.67	< .001	0.39	0.57
c′ path (direct effect of Social Sensitivity on Anxiety)	0.33	7.94	< .001	0.25	0.42
c - c′ path (indirect effect of Social Sensitivity on Anxiety)	.014			0.11	0.19
Covariates					
Year in school					
First year	Reference category				
Second year	0.67	0.45	.14	−0.21	1.56
Third year	0.60	0.47	.20	−0.33	1.53
Fourth year	0.30	0.46	.51	−0.60	1.20
Gender					
Man	Reference category				
Woman	1.05	0.34	< .001	0.39	1.71
Other gender identity	6.07	1.14	< .001	3.84	8.30
Race / ethnicity					
White	Reference category				
Latinx	1.26	0.57	.03	0.14	2.37
Black	2.61	0.84	< .001	0.96	4.27
Asian	0.76	0.58	.19	−0.37	1.90
More than one	0.01	1.09	.99	−2.12	2.14
Other racial identity	1.02	0.78	.19	−0.50	2.55

Notes. Coefficients for covariates are from the Total Effects model. Total effects R^2 = .21, $F(12, 2019) = 45.94$, $p < .001$

Table 5

Loneliness Mediates the Relationship Between Social Control and Anxiety

Regression path	*B*	*t*	*P*	LLCI	ULCI
a path (Social Control to Loneliness)	−0.78	−11.51	< .001	−0.92	−0.65
b path (Loneliness to Anxiety)	0.27	19.17	< .001	0.24	0.29
c path (total effect of Social Control on Anxiety)	−0.29	−6.25	< .001	−0.39	−0.20
c′ path (direct effect of Social Control on Anxiety)	−0.08	−1.82	.07	−0.17	0.01
c - c′ path (indirect effect of Social Control on Anxiety)	−0.21			−0.25	−0.17
Covariates					
Year in school					
First year	Reference category				
Second year	0.96	2.09	0.04	0.06	1.86
Third year	0.72	1.48	0.14	−0.23	1.66
Fourth year	0.55	1.18	0.24	−0.37	1.47
Gender					
Man	Reference category				
Woman	1.48	4.32	< .001	0.81	2.14
Other gender identity	6.02	5.2	< .001	3.75	8.29
Race / ethnicity					
White	Reference category				
Latinx	0.38	0.67	0.51	−0.74	1.51
Black	1.61	1.89	0.06	−0.07	3.29
Asian	0.23	0.39	0.69	−0.93	1.40
More than one	−0.73	−0.66	0.51	−2.91	1.45
Other racial identity	0.60	0.75	0.45	−0.95	2.15

Notes. Coefficients for covariates are from the Total Effects model. Total effects R^2 = .19, $F(12, 2019) = 39.80$, $p < .001$

Table 6

Loneliness Mediates the Relationship Between Social Expressivity and Depression

Regression path	*B*	*t*	*P*	LLCI	ULCI
a path (Social Expressivity to Loneliness)	−1.05	19.71	< .001	−1.16	−0.95
b path (Loneliness to Depression)	0.50	31.45	< .001	0.47	0.53
c path (total effect of Social Expressivity on Depression)	−0.52	−11.20	< .001	−0.61	−0.43
c′ path (direct effect of Social Expressivity on Depression)	0.00	0.11	.91	−0.08	0.09
c - c′ path (indirect effect of Social Expressivity on Depression)	−0.52			−0.59	−0.46
Covariates					
Year in school					
First year	Reference category				
Second year	−0.21	−0.38	0.71	−1.29	0.87
Third year	−0.32	−0.56	0.58	−1.46	0.81
Fourth year	−0.68	−1.21	0.23	−1.78	0.42
Gender					
Man	Reference category				
Woman	0.27	0.65	0.52	−0.54	1.07
Other gender identity	7.78	5.58	< .001	5.05	10.52
Race / ethnicity					
White	Reference category				
Latinx	1.68	2.43	0.02	0.33	3.03
Black	1.66	1.62	0.11	−0.35	3.68
Asian	0.06	0.08	0.94	−1.34	1.46
More than one	1.13	0.85	0.40	−1.49	3.74
Other racial identity	1.22	1.28	0.20	−0.65	3.08

Notes. Coefficients for covariates are from the Total Effects model. Total effects R^2 = .38, $F(12, 2019) = 105.11$, $p < .001$

Table 7

Loneliness Mediates the Relationship Between Social Sensitivity and Depression

Regression path	*B*	*t*	*P*	LLCI	ULCI
a path (Social Sensitivity to Loneliness)	0.57	8.34	< .001	0.43	0.70
b path (Loneliness to Depression)	0.48	32.92	< .001	0.45	0.51
c path (total effect of Social Sensitivity on Depression)	0.55	9.92	< .001	0.44	0.65
c′ path (direct effect of Social Sensitivity on Depression)	0.28	6.08	< .001	0.19	0.36
c - c′ path (indirect effect of Social Sensitivity on Depression)	0.27			0.20	0.34
Covariates					
Year in school					
First year	Reference category				
Second year	−0.39	−0.71	0.48	−1.48	0.69
Third year	−0.47	−0.80	0.42	−1.61	0.68
Fourth year	−0.80	−1.41	0.16	−1.90	0.31
Gender					
Man	Reference category				
Woman	−0.30	−0.73	0.46	−1.12	0.51
Other gender identity	8.54	6.1	< .001	5.80	11.29
Race / ethnicity					
White	Reference category				
Latinx	2.51	3.59	< .001	1.14	3.89
Black	2.81	2.71	0.01	0.78	4.85
Asian	0.98	1.37	0.17	−0.42	2.38
More than one	1.72	1.28	0.20	−0.91	4.35
Other racial identity	1.80	1.88	0.06	−0.08	3.68

Notes. Coefficients for covariates are from the Total Effects model. Total effects R^2 = .40, $F(12, 2019) = 110.12$, $p < .001$

Table 8

Loneliness Mediates the Relationship Between Social Control and Depression

Regression path	*B*	*t*	*P*	LLCI	ULCI
a path (Social Control to Loneliness)	−0.78	−11.51	< .001	−0.92	−0.65
b path (Loneliness to Depression)	0.49	32.65	< .001	0.46	0.52
c path (total effect of Social Control on Depression)	−.50	−8.87	< .001	−0.61	−0.39
c′ path (direct effect of Social Control on Depression)	−0.12	−2.51	.01	−0.21	−0.03
c - c′ path (indirect effect of Social Control on Depression)	−0.38			−0.46	−0.31
Covariates					
Year in school					
First year	Reference category				
Second year	0.03	0.05	0.96	−1.07	1.12
Third year	−0.27	−0.46	0.64	−1.42	0.88
Fourth year	−0.38	−0.66	0.51	−1.49	0.74
Gender					
Man	Reference category				
Woman	0.14	0.34	0.73	−0.67	0.96
Other gender identity	8.33	5.92	< .001	5.57	11.09
Race / ethnicity					
White	Reference category				
Latinx	1.45	2.07	0.04	0.08	2.82
Black	1.49	1.43	0.15	−0.55	3.53
Asian	0.20	0.27	0.79	−1.22	1.61
More than one	0.57	0.43	0.67	−2.07	3.22
Other racial identity	1.33	1.38	0.17	−0.56	3.21

Notes. Coefficients for covariates are from the Total Effects model. Total effects R^2 = .39, $F(12, 2019) = 105.97$, $p < .001$