

Loneliness and Depression in College Students During the COVID-19 Pandemic: Boredom and
Repetitive Negative Thinking as Mediators

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Abstract

The COVID-19 pandemic triggered increased rates of depression, especially among college students. Due to social distancing guidelines, loneliness has been suspected as a prominent factor in depression during the pandemic. Research is needed to identify possible mechanisms through which loneliness conveys risk for pandemic-era depression. Two potential mechanisms are boredom and repetitive negative thinking (RNT). This study examined cross-sectional associations between depression, loneliness, boredom, and RNT in a sample of college students ($N = 199$) in April 2020 immediately following campus closure. Results showed a serial indirect effect of loneliness on depression through boredom then RNT. Moreover, specific indirect effects of loneliness on depression were found through boredom and RNT, individually. These data align with cognitive-behavioral theory and identify boredom and RNT as possible mechanisms of the association between loneliness and depression in college students. As such, boredom and RNT might be suitable treatment targets for depression during the COVID-19 pandemic.

Keywords: COVID-19, Depression, Loneliness, Boredom, Repetitive Negative Thinking, College Students

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Efforts to control the coronavirus disease 2019 (COVID-19) pandemic through social distancing, lockdowns, and quarantines have raised concerns about the potential mental health consequences, especially depression (Holmes et al., 2020; Yao et al., 2020). Such concerns have proven well-founded as studies have uncovered high rates of depression since the onset of the pandemic around the world (Bäuerle et al., 2020; Fullana et al., 2020; Huang & Zhou, 2020; Salari et al., 2020) and in the United States (Fitzpatrick et al., 2020). Depression symptoms during the pandemic have increased compared to periods before the pandemic (Chen et al., 2020; McGinty et al., 2020; Wu et al., 2020), including a tripling of the rate of positive depression screens in the United States (Ettman et al., 2020; Twenge & Joiner, 2020). Such research points toward the COVID-19 pandemic's parallel crisis: elevated depression.

Previous research cautions that pandemic-related mental health effects can endure after a pandemic ends (Brooks et al., 2020; Jeong et al., 2016; Maunder et al., 2006). As the early months of COVID-19-induced lockdowns passed, high levels of depression in the United States remained stable or increased, even as anxiety levels began to decline (Twenge & Joiner, 2020). The possibility of persistent effects of the pandemic on depression indicates the importance of understanding risk factors of pandemic-related depression so that interventions can be tailored accordingly (Duan & Zhu, 2020; Galea et al., 2020). To do this, research should focus on identifying potential mechanisms responsible for pandemic-era depression among vulnerable groups (Holmes et al., 2020).

College students are vulnerable to the mental impact of the COVID-19 pandemic due to a number of challenges including campus-closures; reduced access to mental health services; diminished independence; delayed graduation; and loss of research, job, and internship opportunities (Aucejo et al., 2020; Gruber et al., 2020; Seidel et al., 2020; Zhai & Du, 2020). These negative impacts heighten college students' vulnerability to mental health problems, such as depression (Douglas et al., 2020). Consistent with increased risk, college students are exhibiting a surge of depression symptoms. Longitudinal studies show that, compared to before the COVID-19 pandemic, college students' depression has been on the rise, even more so than anxiety symptoms (Elmer et al., 2020; Huckins et al., 2020). Students have reported higher rates of depression than other adult demographic groups during the pandemic (Majumdar et al., 2020; Odriozola-González et al., 2020; Wang, Pan, et al., 2020). This may be due to situational risk factors associated with college students' social isolation (e.g., living alone, amount and type of social contact, and reduced emotional support), implicating loneliness as a potential risk factor for depression in college students during the COVID-19 pandemic (Elmer et al., 2020; Zimmerman et al., 2020).

Loneliness—a perceived deficit in social connection and relationships (Zavaleta et al., 2014)—has been on the radar of mental health experts from the early days of the COVID-19 pandemic due to increases in social isolation (Banerjee & Rai, 2020; Fiorillo & Gorwood, 2020). COVID-19 research has shown that loneliness is common among socially isolated individuals (Tull et al., 2020) and particularly prevalent in young adults (Groarke et al., 2020; Li & Wang, 2020). An increase in loneliness from before to during the COVID-19 pandemic was found in a longitudinal study of college students (Elmer et al., 2020). About half of college students directly

report that the COVID-19 pandemic has increased feelings of loneliness or social isolation (Elmer et al., 2020; Gritsenko et al., 2020). Overall, evidence identifies young adults as vulnerable to loneliness and points toward an increase in college students' loneliness due to the COVID-19 pandemic.

More closely examining loneliness during the COVID-19 pandemic may offer insight into college students' depression, which has been linked to social and interpersonal variables (Alsubaie et al., 2019; Lee et al., 2014; Wright et al., 2014). Loneliness has been related to college student's current depression (e.g., Ceyhan & Ceyhan, 2011; Doğan et al., 2020; Pervin & Ferdowshi, 2016; Wright et al., 2014) and future depression (Rich & Scovel, 1987; Richardson et al., 2017; Wei et al., 2005). When evaluating temporal direction, studies suggest loneliness leads to depression, more so than vice versa, in college students (Rich & Scovel, 1987; Richardson et al., 2017; Vanhalst, Luyckx, Teppers et al., 2012). The association between loneliness and depression among college students has been observed during the COVID-19 pandemic as well (Elmer et al., 2020; Misirlis et al., 2020; Son et al., 2020). Longitudinal data revealed that college students' pandemic-induced increase in loneliness was significantly correlated with students' increase in depression (Elmer et al., 2020). Thus, loneliness has been identified as an important factor for understanding depression risk in college students in the context of the COVID-19 pandemic. Yet more research is needed to understand why loneliness increases risk for depression in college students during the pandemic.

One possible explanation for the link between loneliness and depression is boredom. Boredom is characterized by a disinterest in one's current activities and the associated agitation that prompts the desire for more engaging activity (Barbalet, 1999). Prior pandemics have

highlighted boredom as one of the most prominent negative emotional impacts (Maunder et al., 2003; Reynolds et al., 2008). Individuals under COVID-19 lockdowns have reported concerns about boredom (Academy of Medical Sciences, 2020; Rohail, 2020). Loneliness is associated with boredom in college students (Bovornusvakool et al., 2012; Skues et al., 2016; Tam & Chan et al., 2019), and experience sampling data show that, in daily life, loneliness co-occurs with boredom more than with other emotions (Chin et al., 2017). Qualitatively, college students report loneliness as one of the leading causes of boredom (Harris, 2000). While experts have mentioned loneliness and boredom together as likely effects of the COVID-19 pandemic (Banerjee & Rai, 2020; Serafini et al., 2020), empirical examination of the link between loneliness and boredom during the pandemic is needed. Furthermore, research suggests that boredom predicts depressive symptoms cross-sectionally (Lee & Zelman, 2019; van Hooff & van Hooff, 2014; Wiesner et al., 2005) and longitudinally (Spaeth et al., 2015). Cross-sectional data also support the link between boredom and depression during the COVID-19 pandemic (Chao et al., 2020; Droit-Volet et al., 2020). Evidence of boredom's associations with loneliness and depression suggests it may help bridge the connection between loneliness and depression during the current pandemic.

In addition to boredom, repetitive negative thinking (RNT) may explain why loneliness is related to depression. RNT refers to thought about negative topics that is both perseverative and difficult to control. Examples of RNT include rumination and worry (Ehring & Watkins, 2008). Examining the broad construct of RNT is important because RNT predicts depression better than rumination or worry alone (Gustavson et al., 2018; Takano et al., 2012). RNT predicts future depression (Raes, 2012; Topper et al., 2014), and has been causally linked to depression among college students through experiments that manipulate RNT (Blagden & Craske, 1996;

McLaughlin et al., 2007). Moreover, rumination, a facet of RNT, has been shown to explain the association between college students' loneliness and depression (Vanhalst, Luyckx, Raes et al., 2012; Zawadzki et al., 2013).

RNT could also explain why boredom is related to depression. Researchers theorize that bored individuals may use RNT to meet their need for stimulation or may repeatedly ponder a problem without acting (Kelly & Markos, 2001; Mugon et al., 2018). These ideas are supported by research on facets of RNT, such as worry and rumination. Boredom is associated with worry in college students (Kelly & Markos, 2001), and boredom and worry often co-occur in everyday life (Chin et al., 2017). One study found that boredom predicted rumination longitudinally (Sousa & Neves, 2020). RNT's connection to boredom, as well as its relation to loneliness, indicates that RNT may be an important cognitive mechanism of depression during the COVID-19 pandemic.

The goal of the current study was to test the indirect effects of loneliness on depression accounted for by boredom and RNT. This cross-sectional study focused on college students during the early weeks of campus closure due to the pandemic. It was hypothesized that loneliness would significantly predict depression and that there would be a serial indirect effect of loneliness on depression explained by boredom and RNT.

Method

Setting

On March 11, 2020, the university—located in Virginia, USA—at which data were collected announced a one-week extension of spring break, a transition to online courses after the break, and the temporary closure of on-campus housing (with a waiver for students that did not

have other housing options). Gatherings over 100 people and student activities were cancelled on March 13, and residence hall closures were extended for the remainder of the semester on March 21. The first confirmed COVID-19 case within the university community was reported on March 27, coinciding with a marked increase in local cases. This was closely followed by a statewide stay-at-home order on March 30 in which residents could leave home only for essential activities. All data were collected between April 4 and April 17.

Participants

The sample consisted of 199 undergraduate college students (mean age = 22.03 years) recruited through the psychology department research pool at a large southeastern university. The majority of the participants identified as cisgender women (76.4%) and were not Latinx (88.9%). The sample was racially diverse with 45.7% identifying as White, 35.2% as Black or African American, and 19.1% as another race or as multiracial. Further demographic, housing, and social interaction data are displayed in Table 1. Thirty-six percent of the sample passed the Patient Health Questionnaire-9 cutoff for clinical depression (≥ 10). The sample described here ($N = 199$) excludes participants who incorrectly responded to at least one of four attention check questions ($n = 36$) or had missing data on all items of at least one of the study measures ($n = 4$).

Procedure

The study procedures were approved by the university's Institutional Review Board. Participants provided informed consent before beginning the study. They completed measures online and received research credits in exchange for participating.

Measures

Depression

Severity of depressive symptoms was evaluated using the Patient Health Questionnaire-9 (PHQ-9; Spitzer et al., 1999). This 9-item questionnaire asked participants how often they were bothered by symptoms such as “Little interest or pleasure in doing things” and “Feeling down, depressed, or hopeless” in the past two weeks. Items were rated on a 4-point Likert scale ranging from 0 (not at all) to 3 (nearly every day) and were summed such that higher scores indicated more depressive symptoms. Internal consistency was good in the current sample ($\alpha = .85$).

Loneliness

Loneliness was assessed with the 10-item UCLA Loneliness Scale (version 3-short; ULS-10; Russell, 1996). Participants reported how often they felt detached or alone (e.g. “close to people” and “isolated from others”) over the past two weeks on a four-point scale ranging from 1 (never) to 4 (always). A sum total was calculated after reverse scoring five items, with higher scores indicating more loneliness. Internal consistency was good in the present study ($\alpha = .86$).

Boredom

The 10-item Disengagement subscale of the Multidimensional State Boredom Scale (MSBS-D; Fahlman et al., 2013) was used to measure boredom. Participants were asked to indicate how they have felt about themselves and their lives over the past two weeks on items such as “I am stuck in a situation that I feel is irrelevant” and “Everything seems repetitive and routine to me.” Items were rated on a seven-point Likert scale from 1 (strongly disagree) to 7 (strongly agree), with a higher sum score indicating greater boredom. In the present sample, internal consistency was good ($\alpha = .87$).

Repetitive Negative Thinking

The frequency of repetitive negative thinking in the past two weeks was assessed with the 15-item Perseverative Thinking Questionnaire (PTQ; Ehring, et al., 2011). Statements such as “Thoughts intrude into my mind” and “I keep thinking about the same issue all the time” were rated on a five-point scale from 0 (never) to 4 (almost always). Items were summed, and a higher score indicating more RNT. Internal consistency was excellent in the current study ($\alpha = .97$).

Anxiety

The Generalized Anxiety Disorder-7 (GAD-7; Spitzer et al., 2006) was used to assess generalized anxiety symptom severity. This 7-item measure asked participants to rate how often they have experienced symptoms such as “Feeling nervous, anxious, or on edge” and “Worrying too much about different things” over the past two weeks on a scale from 0 (not at all) to 3 (nearly every day). Sum totals were calculated, with higher scores reflecting greater anxiety. Internal consistency was excellent ($\alpha = 0.91$).

Analytic Strategy

The PROCESS macro (version 3.5; Hayes, 2017) was used to estimate bias-corrected bootstrap confidence intervals (CIs) of the indirect effects using 5,000 bootstrap samples. Effects with 95% CIs that did not include zero were interpreted as significant. The model included loneliness as the independent variable predicting depression with a serial indirect effect through boredom and RNT, in that order, as well as specific indirect effects through boredom and RNT independent of one another. Tests of indirect effects were repeated with generalized anxiety as a covariate because of its high comorbidity with depression (Hasin et al., 2018) and its association with loneliness and depression during the COVID-19 pandemic (Misirlis et al., 2020; Tso et al., 2020). Due to univariate non-normality of study variables (Shapiro-Wilk $ps < .03$), Spearman

correlations were calculated. Potential multivariate outliers were detected by Studentized Deleted Residuals (SDR), standardized Difference in Fit (DFFITS), and standardized Difference in Betas (DFBETAS) cutoff values (Cousineau & Chartier, 2010). The spread of DFFITS and DFBETAS values and inspection of scatter plots suggested that 17 cases may have disproportionately influenced at least one parameter estimate. Conducting analyses including and excluding these cases resulted in only minor differences in parameter estimates that did not affect interpretation, so analyses with all participants were reported. Due to violations of the heteroscedasticity assumption, the HC3 estimator of standard errors was used (Davidson & MacKinnon, 1993).

Results

All study variables were positively correlated (see Table 2). The hypothesized serial mediation model was examined. Unstandardized coefficients are reported here, and standardized coefficients are displayed in Figure 1. There was a serial indirect effect of loneliness on depression through boredom then RNT, $B = .10$ [CI: .06, .15]. There were also specific indirect effects of loneliness on depression through boredom, $B = .11$ [CI: .05, .18] and through RNT, $B = .12$ [CI: .06, .20]. Accounting for the indirect effects, there was not a significant direct effect of loneliness on depression, $B = .08$ [CI: -.02, .19]. The total effect of loneliness, $B = .42$ [CI: .31, .52] accounted for 22% of the variance in depression. Contrasts of the indirect effects did not indicate that one effect was larger than any other. There were no interactions among loneliness, boredom, and/or RNT, all $ps > .20$. To test the robustness of the model, analyses were repeated with anxiety as a covariate (see Figure 2), and the confidence intervals of the indirect effects were consistent with the original model.

Discussion

This study proposed that boredom, followed by RNT, would serially mediate the relation between loneliness and depression. This model was tested in college students during the early stage of the COVID-19 pandemic, soon after campus closure drastically altered students' lives. As hypothesized, loneliness predicted depression, and this relation was explained by a serial indirect effect through boredom and RNT. Specifically, increased loneliness was related to increased boredom, which was associated with more RNT and, in turn, greater depressive symptoms. Boredom and RNT each also independently accounted for part of the association of loneliness with depression. After accounting for the indirect effects, there was not a significant direct effect of loneliness on depression. The indirect effects remained after controlling for generalized anxiety. These results underscore the importance of boredom and RNT as potential mechanisms that explain the association between loneliness and depression in college students during COVID-19 pandemic stay-at-home orders. Recent studies have shown an important connection between college students' loneliness and depression during the COVID-19 pandemic (Elmer et al., 2020; Son et al., 2020). The current study is the first to suggest that boredom and RNT together play a role in this connection.

The findings are timely and important given increased depression among college students in the wake of the COVID-19 pandemic (Huckins et al., 2020; Zimmerman et al., 2020), when social and activity options are limited. The indirect effect of loneliness through boredom and RNT is important because it links behavioral and cognitive perspectives on depression risk. Consistent with Beck's (1963) notion that negative automatic thoughts explain how depressive symptoms originate in the context of stressful experiences, RNT explained the association of boredom, and more distally loneliness, with depression. The serial indirect effect through

boredom and RNT agrees with studies indicating that boredom is associated with decreased attention and spontaneous mind-wandering (Carriere et al., 2008; Isacescu et al., 2017), possibly allowing negative thoughts to emerge. Indeed, boredom can foster introspection and self-reflection (Gana et al., 2000; Vodanovich, 2003), which—when combined with the anxiety, irritability, and sense of meaninglessness that can accompany boredom (Fahlman et al., 2013; Martin et al., 2006; Van Tilburg & Igou, 2012)—may give rise to RNT. Attentional difficulties and subjective meaninglessness associated with boredom may create a context in which RNT may emerge. In turn, RNT predicts depressive symptoms, as indicated by our data and prospective studies (Raes, 2012; Topper et al., 2014).

In addition to the serial indirect effect through boredom and RNT, specific indirect effects indicated that boredom and RNT each uniquely contributed to the relation between loneliness and depression, even when controlling for anxiety. The indirect effect through boredom supports behavioral theories, which recognize that depression risk increases as social and behavioral reinforcement decline (Lewinsohn, 1974). The effect also adds to a growing body of work showing that loneliness and boredom are depression risk factors during the COVID-19 pandemic (Chao et al., 2020; Droit-Volet et al., 2020; Ellmer et al., 2020; Liu et al., 2020). Prior to the pandemic, college students spent more time socializing than doing other activities (Arum & Roksa, 2011; Finlay et al., 2012). As social activity options are limited by the pandemic, and college students are more sedentary than before the pandemic (Huckins et al., 2020), loneliness and boredom both may be consequences. Just as the indirect effect through boredom supports behavioral theories, the indirect effect through RNT supports cognitive theories. Negative cognition explained part of the association of loneliness with depression after accounting for

boredom. Overall, these findings are supportive of both behavioral and cognitive mechanisms that work together and independently in conveying risk for depression.

This study raises important implications for clinical practice. In agreement with the broader literature (Kanter et al., 2010; Kircanski et al., 2012), our findings indicate behavioral and cognitive intervention targets. In the context of a pandemic that presents unique psychological challenges for college students, our data can guide therapists who use interventions that focus on increasing social, pleasant, and valued activity (e.g., behavioral activation) as well as those that focus on cognitive mechanisms of depression (e.g., cognitive therapy). Rather than directly addressing loneliness when treating depression, boredom and RNT may be more proximal targets. Given the pandemic-induced barrier of social distancing, boredom and RNT interventions—which do not rely on social engagement—may be more feasible than interventions focused on loneliness and social activity. Addressing boredom may include behavioral activation to increase valued and pleasant activities (Magidson et al., 2020), engagement in challenging activities (Harju et al., 2016), and cognitive reappraisal (Nett et al., 2010). Our findings further indicate that depression during the pandemic may be addressed through interventions that reduce RNT, such as rumination-focused cognitive-behavioral therapy and mindfulness-based cognitive therapy (Spinhoven et al., 2018).

This study is not without limitations that constrain its interpretation. The study was cross-sectional, although the model was based on prevailing perspectives and data concerning temporally-specific relations among variables (e.g., that loneliness predicts depression and not vice versa; Rich & Scovel, 1987; Richardson et al., 2017; Vanhalst, Luyckx, Teppers et al., 2012). The findings identify potential mechanisms worthy of follow-up in a longitudinal study.

Although the sample is useful for understanding depression in college students, the generalizability to other populations is limited. Generalizability is further limited by the sample consisting predominately of cisgender women, although women in college have been at higher risk for depression, loneliness, and psychological distress during this pandemic (Chang et al., 2020; Elmer et al., 2020; Wang, Hedge, et al., 2020).

In summary, the present study clarifies the association between loneliness and depression in college students during the COVID-19 pandemic. The findings align with theory, previous findings, and the growing recognition that mental health treatment should adapt to specific symptoms that are highlighted by the current pandemic (Bareket-Bojmel et al., 2020). The data extend our understanding by identifying the indirect impact of loneliness on depression through boredom and RNT. This study further demonstrates the independent roles of boredom and RNT in understanding the association of loneliness with depression. Clinically, the findings support boredom and RNT as important depression treatment targets during a pandemic that has limited students' options to engage in social activities.

Conflict of Interest

The authors have no actual or potential conflicts of interest to report.

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Table 1.

Sample Characteristics.

	Mean (SD)	Median	Frequency (Percentage)
Age (range = 18-63 years)	22.03 (5.27)		
Gender			
Cisgender Man			41 (20.6%)
Cisgender Woman			152 (76.4%)
Transgender Man			1 (.5%)
Transgender Woman			0 (0%)
No label			1 (.5%)
Prefer not to answer			4 (2.0%)
Ethnicity			
Latinx			22 (11.1%)
Not Latinx			177 (88.9%)
Race			
White or Caucasian			91 (45.7%)
Black or African American			70 (35.2%)
American Indian, Native American, or Alaskan			1 (.5%)
Native			1 (.5%)
Arab, Middle Eastern, or Arab American			9 (4.5%)
Asian or Asian American			1 (.5%)
Pacific Islander			5 (2.5%)
Other			21 (10.6%)
Multiracial			
Housing before campus closure			
University housing or residence hall			78 (39.2%)
Off campus housing			84 (42.2%)
Parent's or guardian's residence			35 (17.6%)
Other			2 (1.0%)
Housing after campus closure			
University housing or residence hall			6 (3.0%)
Off campus housing			67 (33.7%)
Parent's or guardian's residence			119 (59.8%)
Other			7 (3.5%)
Number of times left residence in last two weeks	7.20 (6.76)		
Number of people living at residence in last two weeks	2.96 (1.82)		
Number of people interacted with in last two weeks		10	

Note. *SD* = Standard deviation. The median was used for “Number of people interacted with in the last two weeks” due to extreme outliers for this variable.

Table 2.

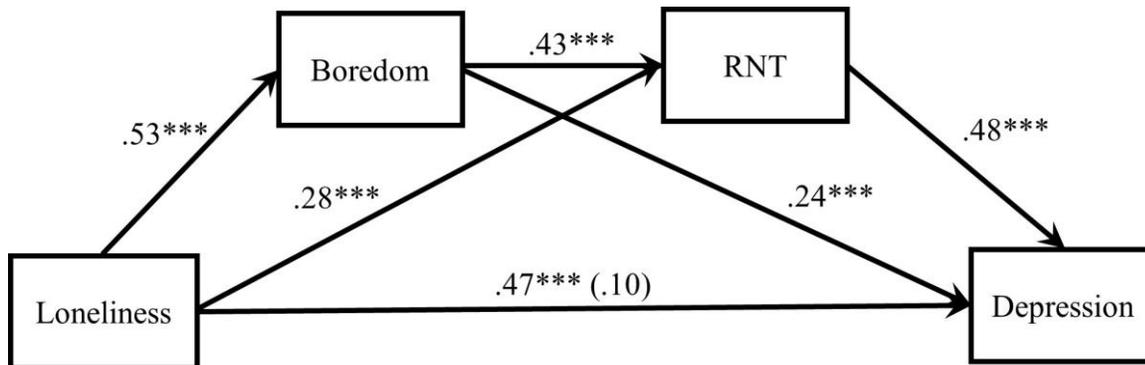
Spearman correlations, means, and standard deviations of study variables.

Variable	1	2	3	4	5
1. Loneliness	--				
2. Boredom	.52***	--			
3. RNT	.49***	.55***	--		
4. Depression	.48***	.61***	.68***	--	
5. Anxiety	.44***	.49***	.71***	.75***	--
Mean	20.51	45.93	26.72	8.04	6.49
SD	6.07	11.87	14.60	5.39	5.40

Note. ***p < .001. Loneliness = UCLA Loneliness total score. Boredom = Multi-dimensional Boredom Scale-Disengaged total score. RNT = Perseverative Thinking Questionnaire total score. Depression = Patient Health Questionnaire-9 total score. Anxiety = General Anxiety Disorder-7 total score.

Figure 1.

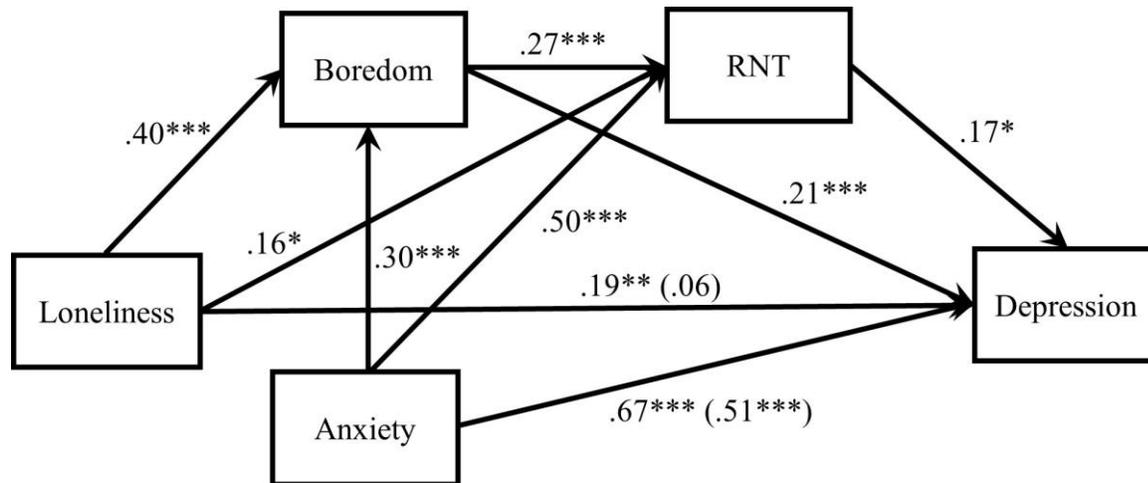
Indirect effects of loneliness on depression.



Note. Coefficients are standardized. *** $p < .001$. The direct effect of Loneliness on Depression is displayed in parentheses following the total effect.

Figure 2.

Indirect effects of loneliness on depression with anxiety as a covariate.



Note. Coefficients are standardized. *** $p < .001$, ** $p < .01$, * $p < .05$. The direct effects of Loneliness and Anxiety on Depression are displayed in parentheses following the total effects