

REPORT

Adolescent loneliness, stress and depressive symptoms during the COVID-19 pandemic: The protective role of friends

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Abstract

The current study examines if perceived negative changes due to COVID-19 are related to adolescent loneliness, stress and depressive symptoms and whether friendship factors (online friend communication, friend support) serve a protective role in these associations. In total, 993 adolescents ($M_{\text{age}} = 16.09$, $SD = 1.24$) from ethnically diverse backgrounds (49% White, 18% Asian/Asian-American, 14% Latinx, 9% Black/African-American, 10% Other) in the United States completed an online survey. Adolescents who perceived more negative changes due to COVID-19 reported more loneliness, stress and depressive symptoms. For loneliness and stress, these associations were qualified by interactions with the friendship factors. Among adolescents with low online friend communication, as perceived negative changes increased, loneliness also increased. At high levels of friend communication, there was no link between negative COVID-19 changes and loneliness. Friend communication and support may protect adolescents from well-being problems stemming from the negative changes in their life due to COVID-19.

KEYWORDS

adolescence, COVID-19, depressive symptoms, friend support, loneliness, stress

It is well established that adolescents value time spent with friends and the support that friends provide (Rubin, Bukowski, & Bowker, 2015). Research has demonstrated the protective role that friends may play in some adolescent issues such as peer victimization (Espinoza, 2018), however, less is known about friends' roles during times of devastating crisis, such as a global pandemic. On March 13, 2020 the United States declared the coronavirus disease

2019 (COVID-19) outbreak as a national emergency. By early May 2020, 48 states announced that schools would not re-open for the 2019–2020 academic year. Thus, adolescents dealt with drastic changes in their daily lives, including school closures and social distancing recommendations. Adolescents have been highly concerned and stressed about COVID-19 (Hawke et al., 2020; Magson et al., 2021) with adolescents' greatest sources of distress centred around the impact to their schooling and time with friends (e.g., Magson et al., 2021). Indeed, researchers warned that adolescents may be especially impacted by COVID-19 due to their need for peer connection (Ellis, Dumas, & Forbes, 2020). Thus, it is important to examine the role of friendship factors on adolescents' well-being during the pandemic. The current study examines the extent to which perceived negative changes due to COVID-19 are related to adolescent loneliness, stress and depressive symptoms. This study also tests whether friendship factors, specifically online friend communication and friend support, serve a protective role in the associations between perceived COVID-19 changes and adolescent loneliness, stress and depressive symptoms.

The 'friendship protection hypothesis' suggests that friends may help buffer against adolescents' negative incidents and the accompanying consequences (Boulton, Trueman, Chau, Whitehand, & Amatya, 1999). Thus far, associations between friendships and adolescent well-being during the pandemic are mixed. Ellis et al. (2020) found that virtual time with friends was related to high levels of depression, but lower loneliness. A longitudinal study among U.S. adolescents revealed that spending less time with friends during the pandemic was predictive of adolescents' feelings of loneliness (Rogers, Ha, & Ockey, 2021). Among Chinese adolescents, teens with the lowest levels of social support reported the highest rates of depression and anxiety symptoms during the pandemic (compared to those with more social support; Qi et al., 2020). However, this study examined social support broadly (family, friends, significant others) and did not test the *moderating* role of friends.

1 | CURRENT STUDY

This study addresses three main research questions. First, do differences exist in adolescents reports of COVID-19-related distancing, perceived negative changes, loneliness, stress, and depressive symptoms based on grade, sex or ethnic background? Past research has identified differences in levels of loneliness, stress, and depressive symptoms based on adolescents' grade, gender and ethnicity (e.g., Barreto et al., 2021; Goodman, McEwen, Dolan, Shafer-Kalkhoff, & Adler, 2005), and some research suggests group differences in COVID-19 related behaviours and feelings (e.g., Oosterhoff & Palmer, 2020). Thus, the current study explores differences based on these demographic factors. The second research question guiding the current study is: Do perceived negative changes due to the COVID-19 pandemic predict adolescents' feelings of loneliness, stress and depressive symptoms, after accounting for adolescent demographics and the extent to which they socially distance? Adolescence is a period in which peer relationships are paramount and it is also a period associated with increased vulnerability to stressful events (Lewinsohn, Clarke, Seeley, & Rohde, 1994; Zhang, Liu, Jiang, Wu, & Tian, 2014). The risk of loneliness is also greatest during adolescence due to the various physiological, psychological and social changes occurring (Laursen & Hartl, 2013). Indeed, the various negative changes stemming from the pandemic (e.g., limited school time) may impact adolescents need to belong, which can increase feelings of loneliness (Cacioppo & Patrick, 2008). We hypothesize that as perceived negative changes due to the pandemic increase, so will adolescent's reports of loneliness, stress and depressive symptoms. The final research question is: Do online friend communication and friend support serve as protective factors in the potential associations between perceived negative COVID-19 changes and adolescent loneliness, stress and depressive symptoms? Findings have shown that to 'keep well' during COVID-19, adolescents report that they are connecting with friends remotely (Hawke et al., 2020). Given the ability for adolescents to maintain communication with friends online during the pandemic, in combination with prior support for the friend protection hypothesis, we expect that friend communication and perceived support will serve as a buffer in the relationships between perceived negative changes due to COVID-19 and adolescent well-being (i.e., loneliness, stress, depressive symptoms). Given the long-term implications of adolescent stress and loneliness such as adolescent

loneliness predicting adult depression and poorer self-rated health (Goosby, Bellatorre, Walsemann, & Cheadle, 2013), it is important to identify factors that may serve to protect adolescents from stress, loneliness and depressive symptoms. The focus on a large, ethnically diverse sample of adolescents from the United States, and the inclusion of multiple friendship and well-being indices will extend current research on the impact of COVID-19 during adolescence.

2 | MATERIALS AND METHODS

2.1 | Participants and procedure

A total of 993 participants who completed the online survey and met the eligibility criteria comprised the final study sample (excluded were: six participants who did not provide consent, three who were younger than 14 years old, and four who lived outside of the United States). Response rate details were unavailable due to the convenience sampling design. Table 1 presents the sample's demographic characteristics. All 50 states were represented in the sample, with a majority of responses from California (15%), Florida (7%), Texas (6%), Virginia (5%) and New York (4%). Participant ages ranged from 14 to 18 ($M_{\text{age}} = 16.09$, $SD = 1.24$). The sample was ethnically diverse with 49% identifying as White, 18% as Asian/Asian-American, 14% Latinx, 9% Black/African-American and 10% Other (primarily including Biracial/Multiracial youth). In addition, when asked about school closures due to the COVID-19 pandemic and how they continued with school work, the most common response was that their school organized online classes and online assignments, followed by the response that the school sent online assignments but there were no online classes.

Participants were recruited via advertisements on Facebook and Instagram. The advertisements targeted users between the ages of 14 to 18 in the United States with the following message: 'Take a short survey about your school and online experiences. Earn an \$8 Amazon gift card!'. When the ad was clicked, the study information and assent page were shown. The ads were run across six phases (each phase included an ad running for 2 weekdays) within the span from April 15, 2020 to May 18, 2020 (range for each phase was from 74 to 362 teens). To account for the span of the study and that some aspects of adolescents' experiences with COVID-19 may have changed as the pandemic continued, the models controlled for the study phase. Given that the study involved no more than minimal risk, a waiver of parental permission was approved (study protocol approved by authors' university IRB). Participants who provided their assent to participate completed an anonymous 20-min survey. At the end of the survey, participants interested in a digital \$8 Amazon gift card were taken to a separate survey (responses not connected to the original survey) to provide their email address.

2.2 | Measures

Demographic information included questions about participants' age, sex, ethnic background, and the country of origin for themselves and their parents (to assess generational status). The psychometric elements that are presented, including reliability estimates, are based on the current sample. To specifically measure COVID-19-related distancing and perceived negative changes, the participants were asked multiple questions assessing the perceived impact of COVID-19 on their lives. To assess *Social Distancing*, they were asked: 'How much are you socially distancing (shelter-in-place, stay at home)?' The response options ranged from 1 (none of the time. I am continuing my normal daily schedule) to 4 (all or almost all of the time. I am staying home almost all of the time). *Perceived Negative Changes* was assessed with an item that asked: 'Overall, how much has the COVID-19 outbreak, and the resulting changes to daily life, affected your life in a negative way?' The response options ranged from 1 (not at all) to 5 (a great deal). The items were drawn from the COVID-19 Adolescent Symptom and Psychological Experience Questionnaire (CASPE, Ladouceur, 2020) and have been used in previous research (e.g., Campione-Barr, Rote, Killoren, & Rose, 2021). Three

TABLE 1 Demographic characteristics of participants

	N	%
Age		
14	132	13.3
15	202	20.3
16	224	22.6
17	312	31.4
18	123	12.4
Grade		
8th grade	73	7.8
9th grade	173	17.4
10th grade	208	21.0
11th grade	260	26.2
12th grade	274	27.6
Sex		
Female	585	59.0
Male	405	41.0
Ethnic background		
White	485	49.0
Asian/Asian American	180	18.2
Latinx	139	14.0
Black/African American	88	8.9
Other	98	9.9
Generational status		
First generation immigrant	75	7.6
Second generation	293	29.5
Third generation or later	624	62.9
School type		
Public school	864	87.0
Private school	62	6.3
Other (e.g., charter, homeschool)	66	6.7
School format during closure		
Printed packets sent home	33	3.3
No classes, but online assignments	350	35.3
Online classes and assignments	531	53.6
No required classes or instruction	30	3.0
Other school format	47	4.7

Note: Adolescents were classified as first-generation if the adolescent and parents were born in Mexico, second-generation if the adolescent was born in the United States, and at least one parent was born in Mexico and third-generation if they were all born in the United States.

items from the Friend subscale of the Multidimensional Scale of Perceived Social Support (Zimet et al., 1988) measured friend support. Participants responded to each item on a scale from 1 (not at all) to 5 (all the time). The items included: 'I have friends with whom I can share my joys and sorrows', 'I can talk about my problems with my friends' and 'I can

count on my friends when things go wrong'. The items were averaged and higher scores represented greater friend support ($\alpha = .90$). In order to assess online friend communication, participants were asked about the frequency of their communication with friends online during the COVID-19 pandemic. Specifically, they were asked: 'Since your school has closed, how often do you talk/chat with friends online (including on your cell phone, on social media, or through online gaming)?' The response options ranged from 1 (less than once a week) to 4 (every day, or almost every day).

Five items were adapted from the loneliness measure developed by Asher and Wheeler (1985). Participants were asked how true the statements were about them with responses ranging from 1 (not true at all) to 5 (always true). Slight modifications were made to make the items more appropriate for adolescents (e.g., removing 'in my class' from the end of the item 'I have nobody to talk to'). The items included, 'I have nobody to talk to', 'I'm lonely', 'I feel alone', 'I feel left out of things' and 'There's nobody I can go to when I need help'. The items were averaged and higher scores indicate more loneliness ($\alpha = .89$). The widely used Perceived Stress Scale (Cohen, Kamarck, & Mermelstein, 1983) assessed participants' subjective appraisals of current life stress. Ten items were each rated on a scale from 1 (never) to 5 (very often). Two sample items included, 'In the last month, how often have you been upset because of something that happened unexpectedly?' and 'Felt nervous and stressed'? The items were averaged; higher scores indicate higher levels of stress ($\alpha = .85$). Finally, depressive symptoms were assessed a 7-item adapted version of the Center for Epidemiologic Studies Depression Scale (Radloff, 1977). Participants were asked how often they had experienced each item in the past week with responses ranging from 1 (rarely or none of the time) to 4 (almost all of the time). Sample items included, 'I felt depressed' and 'I felt sad' ($\alpha = .87$).

2.3 | Data analysis

The statistical analyses were conducted using SPSS Version 27 (IBM SPSS Statistics, IBM Corporation). To explore if there were sex, grade or ethnicity differences among the key study variables, a set of sex (2) X grade (5) X ethnicity (5) analyses of variance were run. Bivariate correlations were run to examine the associations among the key variables. To address the main study aims, a hierarchical linear regression model was run with each of the dependent variables (i.e., loneliness, stress, depressive symptoms). In step 1, the model controlled for study phase, sex (dummy coded, female as the comparison group), grade, ethnicity, generational status and extent of social distancing due to COVID-19. Step 2 included perceived negative changes due to COVID-19, online friend communication and friend support. At step 3, interaction terms were included to assess if the two friendship factors moderate the association between negative changes and loneliness, stress or depressive symptoms (e.g., Friend Support X Negative Changes).

3 | RESULTS

For COVID-19 social distancing, there was a main effect of sex $F(1, 982) = 6.59, p = 0.01, \eta^2 = 0.007$, with females ($M = 3.42, SE = 0.04$) more engaged in social distancing than males ($M = 3.22, SE = 0.06$). A main effect of ethnicity $F(4, 982) = 5.79, p < 0.001, \eta^2 = 0.024$, showed that

Asian-American students ($M = 3.62, SE = 0.08$) reported more social distancing than Black/African-American ($M = 3.19, SE = 0.13$), Latino ($M = 3.34, SE = 0.08$), White ($M = 3.25, SE = 0.04$) and youth from an Other ethnicity ($M = 3.20, SE = 0.09$). Grade was not significant nor were any of the interactions.

In the model with COVID-19 perceived negative changes, there was a main effect of sex $F(1, 982) = 5.41, p = 0.02, \eta^2 = 0.006$, indicating that females reported more negative changes ($M = 3.51, SE = 0.08$) than males ($M = 3.24, SE = 0.08$). In addition, there was a main effect of grade, $F(4, 982) = 2.99, p = 0.02, \eta^2 = 0.013$. Post-hoc Bonferroni tests revealed that 12th grade students reported more negative changes ($M = 3.64, SE = 0.09$) than ninth and 10th grade students ($M = 3.21, SE = 0.10$ and $M = 3.31, SE = 0.09$, respectively). The main effect for ethnicity and the interactions were non-significant. There were no significant effects for online friend communication and

friend support. For loneliness, only a main effect of sex was found $F(1, 946) = 6.06, p = 0.01, \eta^2 = 0.007$ with females ($M = 2.70, SE = 0.08$) reporting more loneliness than males ($M = 2.41, SE = 0.08$). Similarly, only a significant main effect of sex was found for stress, $F(1, 921) = 16.64, p < 0.001, \eta^2 = 0.019$, with females ($M = 3.29, SE = 0.03$) reporting more stress than males ($M = 2.86, SE = 0.04$). Finally, for depressive symptoms there was a main effect of sex, $F(1, 925) = 15.84, p < 0.001, \eta^2 = 0.018$ with females ($M = 2.48, SE = 0.07$) reporting more depressive symptoms than males ($M = 1.98, SE = 0.07$). There was also a main effect of ethnicity for depressive symptoms, $F(4, 925) = 2.87, p = 0.02, \eta^2 = 0.013$. Post-hoc Bonferroni tests revealed that adolescents from White ($M = 2.33, SE = 0.09$) and Other ($M = 2.44, SE = 0.11$) ethnic backgrounds reported more depressive symptoms than adolescents from Asian/Asian-American backgrounds ($M = 2.08, SE = 0.09$).

Bivariate correlations, means and standard deviations for the key variables are presented in Table 2. The preliminary findings show that COVID-19 social distancing was significantly correlated with perceived negative changes and depressive symptoms. More social distancing was related to more negative changes and more depressive symptoms. Interestingly, social distancing was not associated with adolescent reports of the friendship factors nor their feelings of loneliness and stress. However, more perceived negative changes were related to more feelings of loneliness, stress and depressive symptoms. Also, more online friend communication and friend support were related to less loneliness and stress. Overall, the correlations ranged from small to moderate strength.

The final regression model with loneliness as the dependent variable was significant and accounted for 28% of the variance in self-reported loneliness, $F(11, 913) = 32.75, p < 0.001$. As shown in Table 3, among the variables controlled for in step 1, only sex was significant. Both perceived negative changes (due to COVID-19) and friend support were significant. More perceived negative changes ($\beta = 0.45, p < 0.001$) and less friend support ($\beta = -0.37, p < 0.001$) were both related to higher feelings of loneliness. However, the impact of more perceived negative changes on loneliness was qualified by an interaction with online friend communication. Simple slope tests were used to examine the association between perceived negative changes and online friend communication at high and low levels of online friend communication (Figure 1). Among adolescents with low online friend communication, as perceived negative changes due to COVID-19 increased, loneliness also increased ($p = 0.03$). However, among adolescents with high levels of friend communication, there was no association between negative changes and loneliness ($p = 0.40$), suggesting that communicating with friends can protect teens from the loneliness they experience as they perceive more negative changes due to COVID-19.

In assessing the role of perceived negative changes and friendship factors in adolescents' stress, the final model accounted for 21% of the variance, $F(11, 913) = 23.29, p < 0.001$. Among the controls, study phase and sex were both significant. Teens who participated in the study during the later phases reported less stress compared to those who participated in an earlier study phase, and females reported more stress than males. In addition, more

TABLE 2 Bivariate correlations, means, and SDs among the study variables

	1.	2.	3.	4.	5.	6.	7.
1. COVID-19 social distancing							
2. Perceived negative changes	0.09**						
3. Online friend communication	0.06	0.04					
4. Friend support	0.03	-0.02	0.31***				
5. Loneliness	-0.02	0.21**	-0.22***	-0.45***			
6. Stress	0.05	0.35**	-0.19***	-0.19***	0.54***		
7. Depressive symptoms	0.07*	0.37**	-.01	-0.19***	0.61***	0.77***	
Mean	3.35	3.45	3.34	3.68	2.56	3.12	2.34
SD	0.73	1.08	0.97	1.02	1.03	0.78	0.82

* = $p < 0.05$. ** = $p < 0.01$. *** = $p < 0.001$.

TABLE 3 Final hierarchical linear regression models predicting adolescent loneliness, stress, and depressive symptoms

Variable	Loneliness			Stress			Depressive Symptoms		
	β	t	95% CI	β	t	95% CI	β	t	95% CI
Step 1									
Study phase	-0.04	-1.33	-0.07 to 0.01	-0.08	-2.52*	-0.08 to -0.01	-0.04	-1.35	-0.06 to 0.01
Sex	-0.12	-3.84***	-0.37 to -0.12	-0.20	-6.15***	-0.41 to -0.21	-0.21	-6.80***	-0.46 to -0.25
Grade	-0.04	-1.27	-0.08 to 0.02	-0.04	-1.26	-0.06 to 0.12	-0.06	-1.90	-0.08 to 0.01
Ethnicity	0.06	1.82	-0.01 to 0.09	0.06	1.82	-0.01 to 0.08	0.11	3.36***	0.03 to 0.11
Generational status	0.05	1.37	-0.03 to 0.18	-0.04	-1.05	-0.13 to 0.04	-0.04	-1.22	-0.14 to 0.03
COVID-19 social distancing	-0.03	-0.93	-0.12 to 0.04	-0.01	-0.29	-0.07 to 0.05	0.02	0.67	-0.04 to 0.09
Step 2									
Perceived negative changes	0.45	3.70***	0.20 to 0.66	0.36	2.82**	0.08 to 0.44	0.42	3.29***	0.13 to 0.51
Online friend communication	0.09	0.97	-0.11 to 0.31	0.29	2.82**	0.07 to 0.40	0.15	1.47	-0.04 to 0.30
Friend support	-0.37	-3.86***	-0.57 to -0.18	-0.41	-4.10***	-0.47 to -0.17	-0.24	-2.36*	-0.34 to -0.03
Step 3									
Neg. changes X online friend Comm.	-0.31	-2.09*	-0.12 to -0.01	-0.42	-2.75**	-0.11 to -0.02	-0.18	-1.19	-0.08 to 0.02
Neg. changes X friend support	-0.06	-0.39	-0.06 to 0.04	0.35	2.39*	0.01 to 0.09	0.06	0.44	-0.03 to 0.05

Abbreviation: CI, confidence intervals.
 * $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

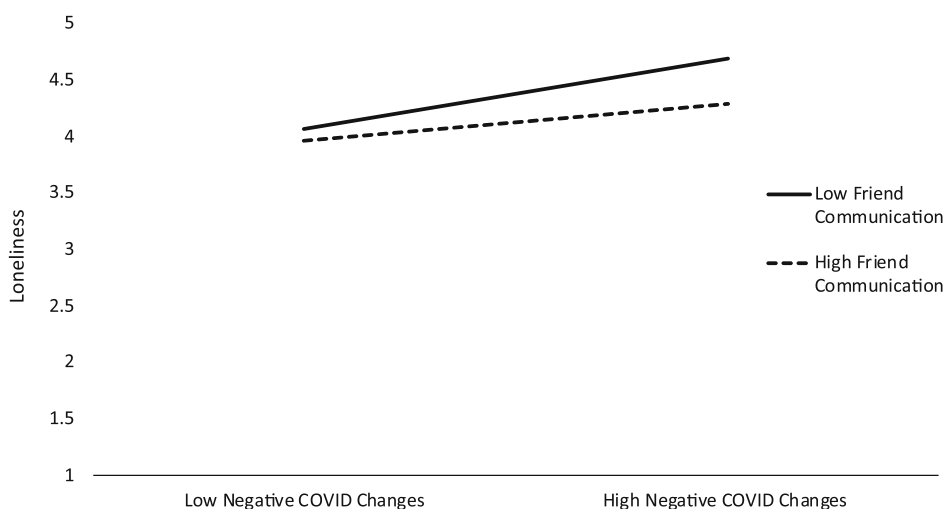


FIGURE 1 Interaction of COVID-19 perceived negative changes and online friend communication in predicting loneliness

COVID-19 perceived negative changes were associated with more stress ($\beta = 0.36, p = 0.01$). Among the friendship factors, higher friend support was related to less stress ($\beta = -0.41, p < 0.001$), but interestingly, more online friend communication predicted more stress ($\beta = 0.29, p = 0.02$). Both of the friend findings were qualified by an interaction with perceived negative changes.

As seen in Figure 2, for online friend communication, among those adolescents who reported low levels of friend communication, as perceived negative changes due to COVID-19 increased, so did reports of stress ($p = 0.03$). However, among adolescents with high online friend communication, there was no significant link between perceived changes and stress ($p = 0.68$). For friend support, although the associations between perceived negative changes and stress were significant at both low and high levels of friend support (p 's < 0.001), it is those adolescents who reported lower friend support who also reported the highest levels of stress.

The final regression model with depressive symptoms was significant and accounted for 23% of the variance in self-reported depressive symptoms, $F(11, 913) = 25.73, p < 0.001$. As shown in Table 3, among the variables controlled for in step 1, sex and ethnicity were significant. In addition, although the moderations were not significant, there was a main effect of perceived negative changes due COVID-19 ($p < 0.001$) such that more perceived negative changes were associated with more depressive symptoms. Friendship quality, but not time spent online with friends, was significantly related to depressive symptoms ($p = 0.02$). That is, adolescents who reported higher friendship quality also reported lower depressive symptoms.

4 | DISCUSSION

The negative impact of COVID-19 on adolescents' health and well-being has been documented in emerging research (e.g., Hawke et al., 2020; Liang et al., 2020). The current findings illustrate that the perceived negative changes due to COVID-19 are related to adolescents' loneliness, stress and depressive symptoms. Although the findings with depressive symptoms do not provide support for the buffering impact of friendships, they do highlight how adolescent well-being is impacted by the pandemic and how friendships may help. The findings with loneliness and stress do offer support for the friendship protection hypothesis and demonstrate how friendship factors may ameliorate the impact of COVID-19. Among the two friendship factors examined in the current study it was online friend

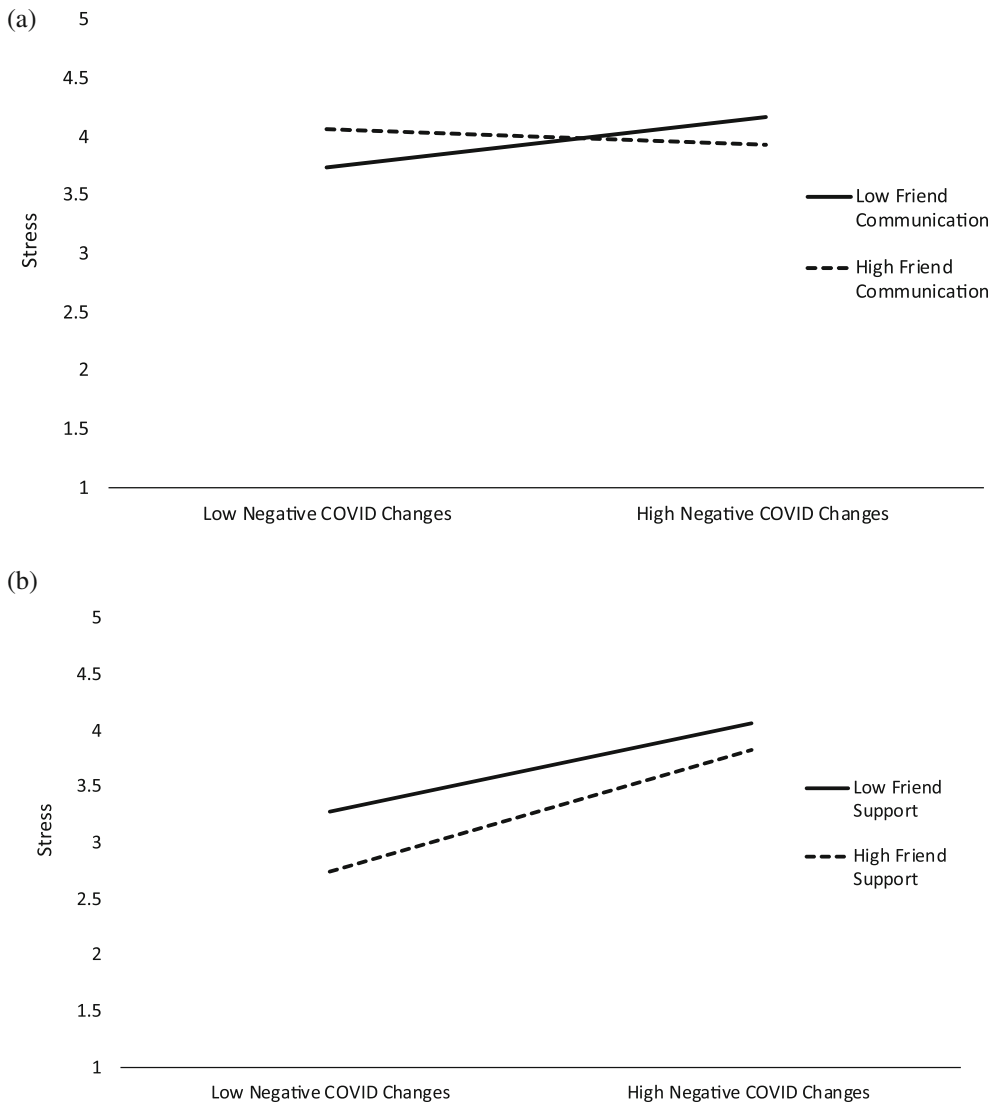


FIGURE 2 Interactions of COVID-19 perceived negative changes with online friend communication (a) and friend support (b) in predicting stress

communication that protected teens from both loneliness and stress. Moreover, the relationship between perceived negative changes due to the pandemic and adolescent stress differed depending on how supported they felt by their friends. Adolescence is marked by increased importance placed on peer relationships and a greater reliance on friends for social support (Smetana, Campione-Barr, & Metzger, 2006), which may be further exacerbated during the COVID-19 crisis. There is growing concern that adolescents' feelings of loss and isolation during the pandemic may exacerbate their feelings of loneliness and overall mental health, particularly for vulnerable youth from marginalized groups (Fish et al., 2020). The current findings are in line with research showing that merely communicating with friends restores adolescents' negative emotions (Espinoza, 2018) and that feeling less supported and spending less time with friends during the pandemic has mental health implications (Rogers et al., 2021). This is also aligned with research showing that adolescents use social media in ways that may further strengthen and stimulate their existing

friendships (Valkenburg & Peter, 2007). Thus, although parents may be concerned about the increased use of social media and screen time during the pandemic (Cauberge, Wesenbeck, De Jans, Hudders, & Ponnet, 2021; Ellis et al., 2020), the findings demonstrate that time spent with friends online, and feeling supported by friends, may help improve adolescents' feelings of loneliness and stress.

The results also shed light on demographic differences such that females and Asian-American youth reported more social distancing (compared to males, and Black/African-American, Latino, White and Other youth, respectively). Female youth also reported more perceived negative changes due to COVID-19. Future studies should consider the ways in which the pandemic has differentially impacted adolescents. Exploring other demographic differences in adolescents COVID-19 related behaviors and feelings is also important. For example, school-aged youth who identify as LGBTQ may be facing both universal and identity-specific stressors due to the pandemic (Fish et al., 2020; Silliman Cohen & Bosk, 2020).

The current study findings may assist school administrators and policymakers as they work to improve student well-being following the COVID-19 pandemic. As schools design and execute re-opening plans, it is important to consider that some students may find the transition to in-person instruction challenging and stressful. Thus, for teachers, in particular, it will be important to teach the 'whole child' to also support their mental health, social development and their need for close, supportive friendships (Qualter, 2003). There is now a better appreciation for the many opportunities that schools afford to students that support their mental health: access to counselors, engagement in extracurricular activities such as sports teams, and the connection with peers, teachers and other school staff. Intervention efforts for adolescents who have dealt with extended periods of elevated feelings of loneliness and stress may be necessary to consider. A recent review of interventions aimed to ameliorate adolescents' psychosocial impact of the pandemic found that although protocols are currently being tested for digital interventions, such as an online Solution Focused Brief Therapy for adolescents that entails a short-term psychotherapy option, these studies are not yet completed (Boldt et al., 2021). These interventions may serve as important supports for adolescents with the ongoing pandemic, especially if there were to be another shutdown with school closures.

This study should be interpreted in light of its limitations. Despite gathering data from a large sample of ethnically diverse adolescents across the United States, the data were collected online via social networking sites and resulted in a convenience sample. Thus, these results may not generalize to adolescents' experiences in other countries or to teens who do not spend much time on social networking sites. These data are limited by the small number of items used to assess some constructs such as the perceived negative changes item which does not provide details into the particular changes that are related to loneliness, stress and depressive symptoms. In addition, the cross-sectional nature of the data did not allow us to test the directionality of the associations between perceived negative COVID-19 changes and adolescents' well-being. Longitudinal studies that provide insight to directionality among these variables is important, since, for example, evidence indicates that lonelier people may engage with social technology differently than those who are less lonely and that overall, there is likely to be a bidirectional association between loneliness and social internet use with friends (Nowland, Necka, & Cacioppo, 2018). Finally, we only considered the protective role of friendships. Past research has demonstrated the dynamic nature of social support from friends and parents in adolescents' daily lives (Schacter & Margolin, 2019). Future research should examine the role of social support in adolescents' feelings of loneliness and stress during the pandemic to consider how parent communication and support may interact with the role of adolescent friendships.

4.1 | Conclusion

The COVID-19 pandemic has disrupted adolescents day-to-day lives, and impacted their well-being (Scott et al., 2021). The current study demonstrates that communicating with friends and feeling supported by friends is one mechanism that may help adolescents to manage pandemic-related challenges. Thus, despite potential concerns

about adolescents' increased time online, adolescents should be encouraged to maintain online communication with friends and to foster supportive friendships, even in the absence of face-to-face encounters.

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AUTHOR CONTRIBUTIONS

Guadalupe Espinoza: Conceptualization; formal analysis; funding acquisition; investigation; methodology; project administration; supervision; writing – original draft; writing – review and editing. **Hannah Hernandez:** Methodology; writing – original draft; writing – review and editing.

ETHICS STATEMENT

This study was approved by the CSU, Fullerton Institutional Review Board (IRB # HSR-19-20-334).

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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