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Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Original article

Parent-Adolescent Conversations About COVID-19 Influence Adolescents' Empathic Concern and Adherence to Health Protective Behaviors

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A B S T R A C T

Purpose: This longitudinal investigation assessed how the frequency of parent-adolescent conversations about COVID-19, moderated by adolescents' stress, influenced adolescents' empathic concern and adherence to health protective behaviors (HPBs) throughout the first year of the COVID-19 pandemic.
Methods: Participants were 181 adolescents (M_{age} = 15.23 years; 51% girls; 47% Latinx) and their parents. Frequency of parent-adolescent conversations about COVID-19 (i.e., pandemic-related symptoms, health behaviors, and social effects), empathic concern toward vulnerable others, and adolescent HPBs were assessed via surveys in the first months of the pandemic, and empathic concern and HPBs were assessed again nine months later.
Results: Results revealed that more frequent parent-adolescent conversations early in the pandemic predicted increased adherence to HPBs throughout the pandemic when adolescents reported low stress (direct effect), but conversation frequency predicted decreased adherence to HPBs via reduced empathic concern when adolescents reported high stress (indirect effect).
Conclusions: Parents and other socialization agents, such as teachers, should be sensitive to adolescents' stress before engaging them in frequent conversations about the pandemic to mitigate the potential negative impact these conversations may have on adolescents' empathic concern and adherence to HPBs. Decreasing adolescents' stress may be an initial step in promoting effective message transference. Collective action (including wearing masks and receiving the vaccine) remains critical to overcoming COVID-19. The current study contributes to our understanding of the processes underlying adolescents' adherence to recommended HPBs, which is critical as pandemic fatigue and stress continue to rise.

IMPLICATIONS AND CONTRIBUTION

This investigation demonstrated that the frequency of parent-adolescent conversations about COVID-19 influenced adolescents' adherence to COVID-19 health protective behaviors over the first year of the pandemic. Generating knowledge about psychosocial mechanisms underlying adolescents' health behaviors may inform the development of strategies to encourage social responsibility among youth during this pandemic and beyond.

Since the United States (U.S.) declared COVID-19 a national emergency in March of 2020, efforts to halt the human transmission of the virus have led to pervasive and prolonged disruptions to daily life, such as stay-at-home orders, school closures, and cancellation of activities [1]. These restrictions have contributed to increased family conflict, financial strain, and psychosocial distress among youth and parents alike [2,3]. Nevertheless, consistent adherence to recommended health protective behaviors (HPBs; e.g., social distancing, masking) has been, and continues to be, critical in limiting transmission of the virus and preventing illness and death [4].

Conflicts of interest: The authors have no conflicts of interest to disclose.

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One group that may be at particular risk of violating HPB protocols is adolescents. Adolescence is marked by decreasing family attachment, increasing peer relationships, and more frequent engagement in risk-taking behavior [5]. These normative developmental processes and behaviors have been disrupted by pandemic-related restrictions that required adolescents to stay at home with their family, keep physical distance from friends, and avoid public spaces. Adolescents may find it difficult to accept the social and emotional costs of COVID-19-related restrictions and, thus, may be less likely to follow recommended health behaviors, thereby elevating the risk for continued community transmission.

This investigation sought to advance our understanding of adolescents' COVID-19 HPBs across the first year of the COVID-19 pandemic in the U.S. We draw from the Health Beliefs Model (HBM), which explains change and maintenance of health-related behaviors and suggests that intrapersonal beliefs, such as self-efficacy, perceived threat and severity of the virus, and perceived benefits of health behavior adherence, influence individuals' treatment seeking and adherence [6]. Recent research on adherence to COVID-19 HPBs suggests that interpersonal and affective factors also shape individuals' adherence to health behaviors [7]. Thus, based on the HBM and related research, we examined the individual and interactive influences of psychosocial (i.e., frequency of parent-adolescent conversations) and intrapersonal psychological factors (i.e., youths' perceived stress and empathic concern) on adolescents' HPBs. Generating knowledge about whether, how, and in what contexts these factors guide adolescents' motivation to follow HPBs may inform the development of strategies that encourage social responsibility during this pandemic and beyond.

Socializing adherence to health protective behaviors via conversations

As primary socialization agents, parents are responsible for teaching their children HPBs that prevent the spread of COVID-19 and may be important sources of adolescents' information regarding the global impact of the virus [8]. Research demonstrates that parent-child conversations influence children's prosocial behavior (i.e., voluntary behavior that is intended to benefit others) [9], and direct conversations about specific behaviors often translate into youths' engagement in those behaviors [10]. Adherence to HPBs in the context of COVID-19 may be considered a form of prosocial behavior, particularly given that some of these behaviors protect others as much or more than oneself (e.g., mask wearing) [11]. Thus, it is likely that frequent parent-adolescent conversations about COVID-19 may direct adolescents' attention to the pandemic and spur their motivation to engage in HPBs. Indeed, as the HBM posits [6,7], psychosocial factors, including conversations with family members, may effectively motivate individuals to seek medical interventions. Although there is evidence that parents engaged their children (birth to 18 years) in conversations about viral transmission suppression (e.g., personal hygiene and social distancing) during the early phase of the pandemic [8], the present study was the first to assess whether and how the *frequency* of COVID-19-related conversations shaped adolescents' engagement in COVID-19 HPBs across the first year of the pandemic.

The role of empathic concern

Parenting practices influence behavior, in part, via changes in prosocial emotions. For instance, empathic concern (i.e., feelings of concern or sorrow for others in need [9]) is promoted through the facilitation of perspective taking and emotional sensitivity to others, which, in turn, motivate prosocial action [12,13]. Thus, frequently discussing COVID-19-related topics, such as HPBs and the societal impacts of the pandemic, may heighten adolescents' attention to the physical and psychological states and needs of others—particularly those most vulnerable to being affected by COVID-19. In turn, this heightened empathic concern may encourage adolescents to practice HPBs with the goal of protecting others from harm. Indeed, emerging evidence on pandemic-specific empathic concern suggests that inducing empathic concern via emotional content relevant to COVID-19 (i.e., a vignette of a vulnerable individual being infected with the virus) was more effective in increasing adults' motivation to socially distance and wear a mask in public than an emotionally neutral presentation of information about COVID-19 guidelines [14]. Based on this work, we hypothesized that frequent parent-adolescent conversations about COVID-19 would direct adolescents' attention to the pandemic and encourage adolescents' ongoing or increased adherence to HPBs by activating their pandemic-specific empathic concern for vulnerable others.

The moderating role of stress

During epidemics and pandemics, individuals may experience heightened stress and anxiety [15–17]. In turn, pandemic-related stress and anxiety may interfere with how individuals communicate and process information pertinent to the stressor [8,18]. Because stress and anxiety can cloud adolescents' ability to remember and retrieve information [19], it is possible that parent-adolescent conversations about COVID-19 might be less effective in promoting HPBs when adolescents are stressed. In addition, frequent conversations about COVID-19—an anxiety-provoking topic [18]—might overwhelm stressed adolescents, thwarting their ability to extend their concern toward others in need. In fact, youths' ability to experience concern for others hinges on their capacity to effectively downregulate their own distress [9]. If youth are overwhelmed, they may experience personal distress (i.e., feeling psychologically and physiologically distressed by another's state) [20], which may lead to lower empathic concern over time and, in the case of COVID-19, prompt less engagement in other-oriented HPBs. In the present study, we tested the hypothesis that adolescents' perceived stress would reduce otherwise positive relations between the frequency of parents' conversations with their adolescents and adolescents' adherence to COVID-19 HPBs by interfering with adolescents' ability to experience pandemic-specific empathic concern.

Present study

The present study had two overarching aims: First, we sought to examine the influence of psychosocial factors on adolescents' HPBs [6]. Specifically, we examined how the frequency of parent-adolescent conversations about COVID-19 related to adolescents' adherence to COVID-19 HPBs over time and whether this relation was mediated by changes in adolescents' pandemic-specific empathic concern. We predicted that the more often parents

and adolescents engaged in conversations about COVID-19 early in the pandemic, the more likely adolescents would experience increases in empathic concern and, in turn, engage in HPBs 9 months later. Second, we assessed how adolescents' stress might influence these associations. Based on prior studies of personal distress and information processing [19,20], we expected that adolescents' perceived stress would qualify as one of the expected relations among COVID-19 conversations, empathic concern, and HPBs, such that frequent conversations between parents and adolescents about COVID-19 would *decrease* adolescents' empathic concern if adolescents concurrently experienced high stress and, by extension, undermine their HPBs. We used a two-timepoint longitudinal design to assess our research questions using data collected at the beginning of the pandemic when cases of COVID-19 were low but steadily rising (April and May of 2020) and during the second surge of COVID-19 in the U.S. when COVID-19 cases and deaths were at an all-time high (November and December of 2020) [4].

Method

Participants

The current sample of 181 parent-adolescent dyads (M_{age} of adolescents = 15.23 years; standard deviation [*SD*] = 0.57; 51% girls; 93% biological mothers) were part of an ongoing longitudinal study of child development among 250 children who have been followed up since the preschool period. In the spring of 2020 and again in the winter of 2020, continuing families ($N = 235$) received an invitation to complete an online survey regarding the COVID-19 pandemic. Invitations were issued via phone calls, texts, and emails. Adolescents in the present study were diverse with regard to ethnicity and race (47% Latinx, 18% black, 10% white, and 25% multiethnic/multiracial) and representative of the surrounding community from which the sample was recruited [21]. Participating families were similarly diverse with regard to economic status (20% resided below 130% of the poverty line and qualified for government assistance, such as food stamps) and about half the parents had completed some college or technical school (48.3%). There were no significant sociodemographic differences between the current participants and the broader sample from which they were drawn.

Procedure

Families were originally recruited to participate in a study of "children's early learning and development" via flyers distributed to community-based childcare centers. Participants were screened by phone to ensure the child was (1) not diagnosed with a developmental disability, (2) between 3.9 and 4.6 months of age, and (3) English proficient. Data for the present study were obtained via online surveys using the Qualtrics survey platform due to COVID-19 restrictions regarding in-person data collection. Surveys were completed individually on participants' own devices during April and May of 2020 and again during November and December of 2020. Informed consent and assent for the present study were obtained before survey completion, and surveys took approximately 1.5 hours to complete. Adolescents and parents were compensated for their time, and all procedures were approved by the human research review boards of the participating universities.

Measures

Frequency of parent-adolescent conversations about COVID-19 (T1). At T1, adolescents and parents reported how often they talked to each other about six topics relevant to COVID-19 during the past 2 weeks from 1 (*not at all*) to 5 (*daily*). Topics included (1) symptoms and signs of COVID-19, (2) things to do to prevent getting or spreading COVID-19, (3) what to do if someone in their home got sick with COVID-19, (4) social distancing, (5) health-care problems due to COVID-19, and (6) discrimination against people because of the pandemic. Adolescent and parent reports were significantly correlated, $r(142) = .20$, $p = .018$, and aggregated to capture both adolescents' and parents' perception of the frequency of engagement in these conversations to mitigate informant bias. As Kraemer et al. [22] argue, it is necessary to acquire and aggregate multiple independent observations from different informants within the same context to remove extraneous variance due to perspective. Particularly given the shared nature of conversational experiences, aggregating multiple perspectives yielded a more valid account of how often parent-adolescent conversations were happening. Cronbach's αs equaled .82 for both parent- and adolescent-reported conversations and remained strong ($\alpha = .81$) when all parent and adolescent items were loaded together.

Adolescents' perceived stress (T1). Adolescents completed the Perceived Stress Scale at T1 [23]. Participants reported how much they experienced 10 stress items during the preceding two weeks (e.g., "how often have you felt nervous and stressed?") using a 5-point Likert scale (0 = *never* to 4 = *very often*; Cronbach's $\alpha = .77$).

Adolescents' pandemic-specific empathic concern (T1, T2). Adolescents reported on their empathic concern for those affected by COVID-19 at T1 and T2 using four items from Pfattheicher et al. [14]. Participants rated each item (e.g., "I am very concerned about those who are most vulnerable to getting sick from COVID-19") on a scale from 1 (*not true*) to 3 (*certainly true*; Cronbach's αs at T1 and T2 equaled .87 and .85, respectively). A standardized residualized gain score (RGS) was calculated to measure change in empathic concern from T1 to T2 [24]. An RGS represents the deviation of scores at T2 from the regression line of T2 on T1 scores, which leaves only variability that is unexplained by T1 empathic concern—construed as the variability due to change [24]. In other words, positive scores indicate larger-than-expected increases in empathic concern, and negative scores indicated smaller-than-expected increases in empathic concern based on the adolescent's initial empathic concern score at T1. Although it is argued that RGSs may be biased in nonexperimental studies when there are suspected subpopulations in the data [24], we sampled from a population of individuals from one geographical region and who are of a similar sociodemographic background. Thus, we have no reason to suspect a biased estimation of the RGS in our model.

Adolescents' adherence to health protective behaviors (T1, T2). Adolescents reported on how often in the past 2 weeks they engaged in HPBs to protect them and others against COVID-19 across 14 items at T1 and 21 items at T2 on a scale from 1 (*not at all*) to 5 (*always*). Items involved HPBs reflecting cleanliness (e.g., hand washing, avoiding touching face), avoiding public

spaces/travel, social distancing, and staying at home (Cronbach's alpha T1 = .88; T2 = .94). Additional items were added at T2 to reflect changes to Centers for Disease Control and Prevention (CDC) recommendations between T1 and T2 (e.g., wearing a mask). We created a composite score at each timepoint because we were interested in frequency of adherence to all HPBs recommended by the CDC, thus accurately capturing variations in adherence.

Covariates. All analyses controlled for adolescents' age, gender, ethnicity/race (i.e., Latinx vs. non-Latinx), and family income-to-needs based on the parent's reported household income (assessed at age 12), which included all financial contributions to the household (e.g., salary, child support), divided by the appropriate poverty threshold for the household size and number of children younger than 18 years in the home.

Data Analytic Plan

All analyses were conducted in SPSS 26 and M*plus* (version 8.5) [25]. Study variables were evaluated to ensure they met parametric statistics assumptions. Using G*Power analyses, we determined that the sample size was sufficiently powered to detect small to medium effects [26].

After descriptive and bivariate analyses, a path model evaluated whether the frequency of parent-adolescent conversations about COVID-19, adolescents' perceived stress, and the interaction between the two at T1 predicted changes in adolescents' pandemic-specific empathic concern and changes in their adherence to HPBs from T1 to T2. Based on recommendations by Cohen et al. [27], all continuous study variables were mean-centered. We also tested the indirect effect of frequency of conversations (and its interaction with stress) on changes in adherence to HPBs via residualized changes in empathic concern (see Figure 1 for conceptual model). Effects were estimated using bootstrapping at 10,000 resamples to control for type I error, obtain confidence limits and standard errors (SEs) for the indirect effect test that are preferable to the traditional Sobel test [28], and mitigate power problems due to the asymmetric and abnormal sampling distribution of indirect effects [29]. We rejected the null hypothesis (i.e., no indirect effect) if the 95% confidence interval (CI) of an estimate did not include zero [28].

Missing data

Of the 181 parent-adolescent dyads who participated, 80% of dyads completed both T1 and T2 surveys, 10% of dyads completed either the T1 or T2 survey but not both, and 10% of dyads were missing either parent or adolescent reports for the T1 or T2 survey. Across specific variables, data were missing for parent-adolescent conversation frequency ($n = 37$ were missing data from either or both respondents; 20.4%), perceived stress ($n = 25$; 14%), empathic concern at T1 ($n = 26$; 14%) and T2 ($n = 24$; 13%), residualized change in empathic concern ($n = 42$, 23.3%), and HPBs at T1 ($n = 24$; 13%) and T2 ($n = 18$; 10%). Missing data were handled using full-information maximum-likelihood as supported by Little's [30] missing completely at random test, $\chi^2\,(30) = 30.89$, $p = .42$.

Results

Descriptive statistics

Means, SD, and zero-order correlations among the study variables are presented in Table 1. On average, parents and adolescents engaged in ~two COVID-19 conversations per week during the early stages of the pandemic, and on average, adolescents reported relatively low levels of perceived stress. Adolescents reported high levels of pandemic-specific empathic concern at both timepoints, but no significant changes in empathic concern were found across time, $t(138) = .63$, $p = .49$. Adolescents reported engaging in COVID-19 HPBs often, but the frequency of HPB adherence decreased across time, $t(144) = 5.25$, $p < .001$.

A multivariate analysis of variance revealed a main effect of gender (Wilks' $\lambda = .75$, $p < .001$), but not of race/ethnicity (Wilks' $\lambda = .96$, $p = .49$) or their interaction (Wilks' $\lambda = .98$, $p = .86$) across the primary study variables. Relative to boys, girls expressed higher perceived stress ($M_{diff} = 0.47$, $p < .001$), higher empathic concern at T1 ($M_{diff} = 0.36$, $p < .001$) and T2 ($M_{diff} = 0.36$, $p < .001$), greater increases in empathic concern across time ($M_{diff} = 0.46$, $p = .006$), and more adherence to HPBs at T2 ($M_{diff} = 0.36$, $p = .01$).

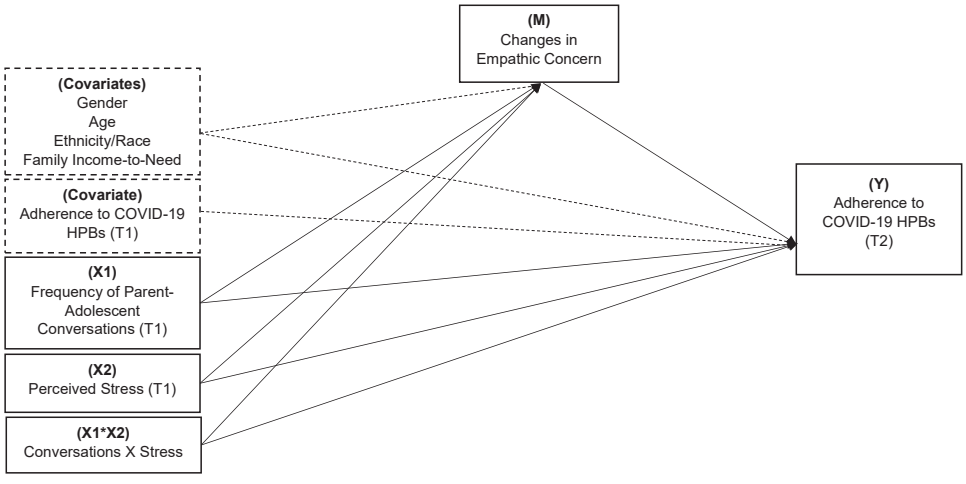

Figure 1. Conceptual model predicting changes in adherence to health protective behaviors (HPBs) across the first year of the pandemic.

Table 1
Descriptive statistics and bivariate correlations among study variables

Variables	1	2	3	4	5	6	7	8	9
1. Parent-adolescent conversations (T1)	-								
2. Perceived stress (T1)	−.04	-							
3. Empathic concern (T1)	.45***	.08	-						
4. Empathic concern (T2)	.23**	.08	.64***	-					
5. Change in empathic concern	−.05	.01	.00	.77***	-				
6. Adherence to HPBs (T1)	.32***	−.11	.38***	.35***	.14	-			
7. Adherence to HPBs (T2)	.31***	.02	.29***	.36***	.25**	.55***	-		
8. Age	−.08	.02	.02	.09	.17*	.05	.07	-	
9. Family income-to-need	−.17	.01	−.03	−.03	.00	−.10	−.26**	.05	-
Mean	2.61	1.59	2.44	2.43	0.00	4.10	3.72	15.23	2.45
Standard deviation	0.71	0.72	0.58	0.56	1.00	0.79	0.84	0.57	1.54

Note. Change in empathic concern is a standardized RGS.
HPBs = health protective behaviors; RGS = residualized gain score; TI = time 1; T2 = time 2.
* $p < .05$, ** $p < .01$, *** $p < .001$.

Impact of conversations and stress on empathic concern and adherence to health protective behaviors

Standardized parameter estimates for the path model are shown in Table 2. There was a significant interaction between parent-adolescent conversations and perceived stress in predicting changes in empathic concern from T1 to T2. As depicted in Figure 2, parent-adolescent conversations predicted smaller-than-expected changes in empathic concern over time at high levels of perceived stress (i.e., +1 *SD*), $b = -0.42$, $SE = 0.20$, $p = .036$, 95% CI [-0.75, -0.09], but not at low levels of perceived stress (i.e., -1 *SD*), $b = 0.15$, $SE = 0.16$, $p = .35$, 95% CI [-0.13, 0.38]. We used the Johnson-Neyman technique [31] to graph the interactive cross-over between conversation frequency and perceived stress in predicting changes in empathic concern and adherence to COVID-19 HPBs. This technique identifies a region of significance at which the simple slope becomes statistically significant and shows confidence bands that specify the simple slope estimate [32]. Residualized gains in empathic concern predicted increased adherence to COVID-19 HPBs from T1 to T2. There was a significant direct effect of the interaction between the frequency of parent-adolescent conversations and adolescents' perceived stress in predicting adolescents' COVID-19 HPBs. As depicted in Figure 3, more frequent parent-adolescent conversations predicted adolescents' increased adherence to HPBs at low levels of perceived stress, $b = 0.29$, $SE = 0.12$, $p = .012$, 95% CI [0.09, 0.47], but not at high levels of perceived stress, $b = -0.03$, $SE = 0.11$, $p = .80$, 95% CI [-0.22, 0.15]. Finally, there was a significant indirect pathway from the conversations by stress interaction to decreased COVID-19 HPBs through decreased empathic concern, showing partial mediation. Taken together, more frequent parent-adolescent conversations predicted increased HPBs across the first 9 months of the COVID-19 pandemic among adolescents who reported low levels of perceived stress but decreased HPBs via reductions in empathic concern among adolescents who reported relatively high stress at the start of the pandemic.

Discussion

This study sheds new light on how family socialization processes and empathic concern in contexts of adolescent stress influenced adolescents' adherence to COVID-19 HPBs during the first year of the COVID-19 pandemic. The findings demonstrate that, depending on adolescents' level of perceived stress,

Table 2
Parameter estimates for the structural model predicting adolescents' COVID-19 HPBs from parent-adolescent conversations about COVID-19 (as moderated by adolescents' perceived stress) and changes in adolescents' empathic concern

Variables	Change in empathic concern			Adherence to HPBs		
	β (SE)	*p*	95% CI	β (SE)	*p*	95% CI
Controls						
Gender (girls = 1)	.24 (.09)	.008	.086, .380	.07 (.07)	.346	−.049, .181
Age	.15 (.09)	.090	.002, .292	.03 (.07)	.617	−.080, .146
Ethnicity/race (Latinx = 1)	.17 (.08)	.027	.040, .294	.02 (.06)	.754	−.083, .126
Family income-to-need	.03 (.09)	.763	−.115, .170	−.21 (.07)	.002	−.324, -.101
Adherence to HPBs (T1)	-	-	-	.44 (.08)	<.001	.305, .556
Predictors						
Change in empathic concern (M)	-	-	-	.16 (.08)	.043	.033, .285
Parent-adolescent conversations (X1)	−.10 (.09)	.244	−.234, .038	.11 (.07)	.109	−.002, .225
Perceived stress (X2)	−.08 (.09)	.412	−.233, .079	.05 (.07)	.491	−.070, .177
Conversations x stress (X1*X2)	−.21 (.09)	.026	−.348, -.045	−.14 (.07)	.044	−.250, -.028
Indirect effect				−.03 (.02)	-	−.075, -.001
Direct effect				−.14 (.07)	-	−.250, -.028
Total effect				−.17 (.07)	-	−.288, -.058
R^2	.17			.41		
Cohen's F^2	.20			.69		

Note. Indirect effect is from interaction between parent-adolescent conversations and stress (X1*X2) to change in adherence to HPBs (Y) through change in empathic concern (M; see conceptual model in Figure 1). Change in empathic concern is a standardized residualized gain score. No *p*-values given for indirect effects, as indirect effects are known to be abnormal.
β = standardized regression coefficient; CI = confidence interval; HPBs = health protective behaviors; SE = standard error.

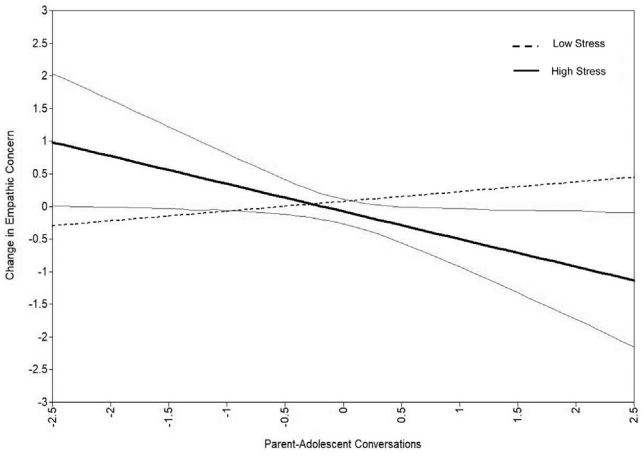

Figure 2. Interaction between frequency of parent-adolescent COVID-19 conversations and adolescents' perceived stress in predicting change in empathic concern. *Note*. Regression lines along with a 95% confidence interval are presented. Solid line represents significant slope. Confidence interval is not presented for non-significant slope to ease interpretability.

frequent conversations about COVID-19 with one's parent could help or hinder changes in adolescents' empathic concern and adherence to HPBs across time. This study is one of the first to assess the influence of both interpersonal and intrapersonal factors on adolescents' COVID-19 HPBs using a longitudinal approach. Moreover, the current findings begin to clarify how and for whom conversations about major stressors, such as the COVID-19 pandemic, may help or hinder positive health behaviors.

Conversations between parents and adolescents provide opportunities for the communication of values, norms, and rules [33], which, in turn, shape behavior [34]. The current findings extend prior research by showing that the frequency of parent-adolescent conversations about COVID-19 played a specific role in socializing adolescents' pandemic-related empathic concern and HPBs. Importantly, however, we found that adolescents' perceived stress qualified these relations. Specifically, among adolescents who reported relatively high levels of perceived stress, frequent conversations with their parents about COVID-19 decreased their empathic concern toward vulnerable others over time, which, in turn, decreased their adherence to HPBs. If stressed adolescents were already psychologically overwhelmed, messages relayed by parents about COVID-19 (whether positive or negative) may have caused even more stress by focusing the adolescent's attention on the stressor, eventuating in an emotional blunting effect. As a result, this emotional blunting may have eroded adolescents' prosocial action (i.e., adherence to HPBs). This pattern is consistent with previous research showing that youth experiencing personal distress, particularly in contexts involving others' suffering, are more likely to flee or exhibit self-soothing behavior rather than prosocial behavior [35].

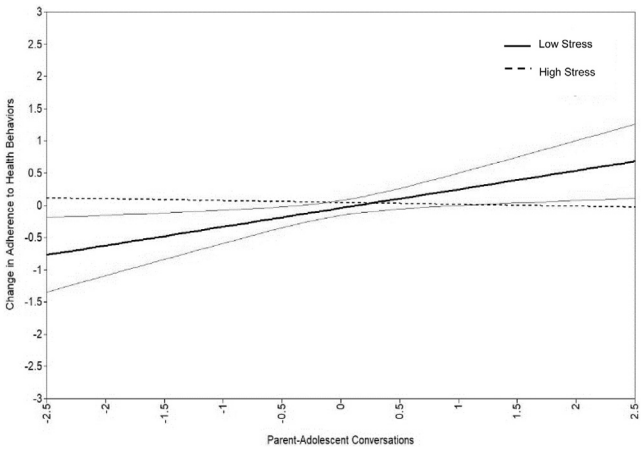

Figure 3. Interaction between frequency of parent-adolescent COVID-19 conversations and adolescents' perceived stress in predicting change in adherence to health protective behaviors (HPBs). *Note*. Regression lines along with a 95% confidence interval are presented. Solid line represents significant slope. Confidence interval is not presented for insignificant slope to ease interpretability.

It is important to note that engaging in frequent parent-adolescent conversations about COVID-19 when adolescents are experiencing high levels of stress may signal other features of the family context that could hinder HPBs. For example, it is possible that parents who engaged their adolescents in frequent conversations about COVID-19 despite their child's high levels of stress may not have recognized their child's distress because of their own feelings of anxiety or a broader insensitivity to their child's needs. This finding speaks to the need for efforts to encourage sensitive parenting in the context of COVID-19 (and other major life stressors) so that parents can tailor their support and socialization efforts to the social-emotional needs of their children.

Among adolescents who reported relatively low levels of perceived stress, higher frequencies of parent-adolescent conversations about COVID-19 increased adherence to HPBs. Adolescents who were experiencing less stress may have had the necessary psychological resources to process and direct their attention to pandemic-related messages, which, in turn, may have allowed them to appreciate how their own actions might play a role in ending the pandemic. Relatively frequent conversations about health restrictions and the sociopolitical repercussions of these restrictions may have prepared less-stressed adolescents for the effort that would be required to consistently and intensively combat the virus via adherence to HPBs. Furthermore, because discussing stressful events in ways that facilitate the expression of emotions and experiences may supplement youths' regulatory capacities, it is possible that less-stressed adolescents may have engaged in more emotion-focused conversation about the various aspects—both positive and negative—of the pandemic. Parents' scaffolding of emotion-focused conversations might have encouraged adolescents to attend to their own emotional needs and the needs of others, and at the same time they may have alleviated adolescents' anxiety related to the pandemic [36]. More research is needed to understand if and how specific messages of varying content and valence may differentially affect adolescents' empathic concern and health behaviors.

Implications

This study has implications for parents, teachers, and public health officials who seek to encourage adolescents' HPBs in the context of the ongoing COVID-19 pandemic and likely with regard to other health outcomes (e.g., obesity, substance use). Considering and addressing adolescents' stress before frequently communicating with them about the pandemic may positively influence how much adolescents care about the effects of their

behaviors on vulnerable others and the extent to which they help reduce the spread of the virus. Indeed, recent work has highlighted the negative impact of overexposure to COVID-19 in the media on youths' acute stress and depressive symptoms, suggesting that transferring messages about emotionally salient topics may be beneficial only to the extent it does not overwhelm adolescents and thwart their capacity to act on such messages [15]. It is important to note that, just as too much exposure can hinder positive development, too little communication with adolescents about stressful events may also negatively impact their mental health [37]. Thus, we encourage parents, teachers, and providers to adopt a sensitive approach to talking about the pandemic (and other major life stressors) with youth. Such conversations should be tailored to adolescents' socioemotional strengths and vulnerabilities in ways that optimize their capacity to attend to the stressor at hand and act in ways that protect and promote the health and wellbeing of themselves and others. Furthermore, our findings have implications for how public health officials may most effectively prompt adolescents' engagement in HPBs now and in the future. Consistent with the findings of Pfattheicher et al. [14], infusing parent-adolescent conversations about COVID-19 with messages that activate empathic concern for others, such as considering the perspectives of vulnerable individuals, may heighten adolescents' motivation to engage in HPBs over time.

Limitations

Despite this study's strengths, there are some limitations worth noting. First, we only collected data from one sample of adolescents in the U.S., thus limiting the generalizability of these findings to adolescents from other national and international regions. Second, the limited waves of available data impeded our ability to examine trajectories of change in HPBs. Third, we focused on one period of adolescence (middle adolescence), and thus, additional research is needed to examine the potential for differential developmental effects of conversations on HPBs across adolescence. Fourth, the current focus on the frequency of COVID-19 conversations limited our ability to examine how specific conversational content (as well as valence and quality of content) may influence adolescents' empathic concern and HPBs. Researchers would benefit from gathering direct observations of parent-adolescent COVID-19 conversations to extend this research. Fifth, although aggregating across parent and adolescent informants limited the bias associated with any single perspective, future research would benefit from using experience sampling methods to more objectively measure frequency of conversations across time. Finally, we had a relatively small sample and, thus, did not have the power to use a more complex statistical analysis to assess change (i.e., a latent difference score).

Conclusion

Adolescents have experienced social-emotional challenges throughout this pandemic because of novel behavioral restrictions. However, it is important to understand when and why adolescents follow recommended HPBs despite the promise of vaccination efforts, particularly as pandemic fatigue and stress persist. Our findings demonstrate that conversations about COVID-19 with adolescents may be maximally beneficial when parents and other socialization agents, such as teachers, gauge and address adolescents' psychological wellbeing before engaging them in pandemic-talk. Although COVID-19 cases are projected to decrease in the U.S. as vaccination rates increase, collective action (including wearing masks and receiving the vaccination) remains critical to overcome the virus. Looking ahead, this study can inform our approach to engaging adolescents in future health-protection initiatives, whether in the context of epidemics or ongoing health concerns, such as safe sex practices.

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