

# Attitudes and Psychological Factors Associated With News Monitoring, Social Distancing, Disinfecting, and Hoarding Behaviors Among US Adolescents During the Coronavirus Disease 2019 Pandemic

Benjamin Oosterhoff, PhD; Cara A. Palmer, PhD

[+ Supplemental content](#)

**IMPORTANCE** As coronavirus disease 2019 (COVID-19) spreads across the world, it is critical to understand the psychological factors associated with pandemic-related behaviors. This perspective may be especially important to study among adolescents, who are less likely to experience severe symptoms but contribute to the spread of the virus.

**OBJECTIVE** To examine psychological factors associated with adolescents' behaviors during the COVID-19 pandemic.

**DESIGN, SETTING, AND PARTICIPANTS** This self-reported survey conducted from March 20 to 22, 2020, recruited a population-based sample of adolescents via social media to complete an anonymous survey. Participants were eligible if they had internet access, lived in the United States, and were aged 13 to 18 years.

**MAIN OUTCOMES AND MEASURES** Outcomes included COVID-19 news monitoring, social distancing, disinfecting, and hoarding behaviors during the 7 days after the United States declared a national emergency. The psychological factors were attitudes about COVID-19 severity, social responsibility values, social trust, and self-interest. The a priori hypotheses were that greater attitudes about the severity of COVID-19, greater social responsibility, and greater social trust would be associated with greater news monitoring, social distancing, and disinfecting, whereas greater self-interest would be associated with more hoarding.

**RESULTS** The sample included 770 adolescents collected via convenience sampling (mean [SD] age, 16.3 [1.1] years; 575 girls [74.7%]). Many teens reported not engaging in pure social distancing (528 [68.6%]), but they were monitoring the news (688 [89.4%]) and disinfecting daily (676 [87.8%]). Some teens reported hoarding (152 [19.7%]). Attitudes about the greater severity of COVID-19 were associated with more social distancing ( $\beta = 0.18$ ; 95% CI = 0.10 to 0.25), disinfecting ( $\beta = 0.16$ ; 95% CI = 0.08 to 0.23), and news monitoring ( $\beta = 0.26$ ; 95% CI = 0.18 to 0.33) but also more hoarding ( $\beta = 0.08$ ; 95% CI = 0.01 to 0.16). Greater social responsibility was associated with more disinfecting ( $\beta = 0.24$ ; 95% CI = 0.17 to 0.32) and news monitoring ( $\beta = 0.14$ ; 95% CI = 0.07 to 0.22) and less hoarding ( $\beta = -0.07$ ; 95% CI =  $-0.14$  to  $-0.01$ ). Greater self-interest values were associated with less social distancing ( $\beta = -0.08$ ; 95% CI =  $-0.15$  to  $-0.01$ ) and more hoarding ( $\beta = 0.08$ ; 95% CI = 0.01 to 0.15). Greater social trust was associated with less hoarding ( $\beta = -0.09$ ; 95% CI,  $-0.16$  to  $-0.02$ ).

**CONCLUSIONS AND RELEVANCE** The results of this survey study suggest that emphasizing the severity of COVID-19 and the social implications of pandemic-related behaviors may be important for teens, particularly for those who are not following preventive health behaviors or who are engaging in hoarding.

JAMA Pediatr. doi:10.1001/jamapediatrics.2020.1876  
Published online June 29, 2020.

**Author Affiliations:** Department of Psychology, Montana State University, Bozeman.

**Corresponding Author:** Benjamin Oosterhoff, PhD, Department of Psychology, Montana State University, PO Box 173440, Bozeman, MT 59717 ([benjamin.oosterhoff@montana.edu](mailto:benjamin.oosterhoff@montana.edu)).

The novel coronavirus disease 2019 (COVID-19) was declared a pandemic on March 11, 2020,<sup>1</sup> and a US national emergency on March 13, 2020. As of March 22, 2020, there were more than 290 000 confirmed cases worldwide<sup>2</sup> and more than 15 000 confirmed cases in the United States.<sup>3</sup> Current global efforts are largely focused on slowing the spread and social effects of the virus, which relies on the compliance of individuals with social distancing and proper hygiene recommendations.<sup>4</sup> Similarly, engagement in antisocial behaviors, such as hoarding, may result in broader social and medical effects of the pandemic by contributing to shortages of food and other resources within communities. As COVID-19 continues to spread and overload the medical systems in the United States and in countries around the world, it is critical to understand the psychological factors that are associated with pandemic-related preventive behaviors (ie, monitoring the news for updates, social distancing, and hygiene or disinfecting), along with antisocial behaviors (ie, hoarding supplies).

We examined psychological factors associated with news monitoring, social distancing, disinfecting, and hoarding behaviors among a large sample of US adolescents. Adolescence is a developmental period characterized by expanding autonomy and greater salience of peer relationships,<sup>5</sup> which may contribute to prioritization of peer social interactions over the current social distancing recommendations. Further, pediatric patients appear to experience less severe symptoms or more asymptomatic cases of COVID-19 compared with adults<sup>6</sup>; thus, adolescents may be more likely to engage in behaviors that contribute to the spread of the infection (eg, lack of distancing and hygiene behaviors) and may be less likely to monitor emerging news stories about the virus.

Several psychological factors likely contribute to variation in the way youth are responding to the COVID-19 pandemic. For instance, attitudes about the severity of COVID-19, including the belief that COVID-19 is similar to influenza, likely vary and may be associated with preventive behaviors (or lack thereof). Others have recognized the importance of community attachments—including greater social responsibility values, social trust, and prioritizing others over the self—for engagement in prosocial behavior and avoidance of antisocial behavior.<sup>7,8</sup> Because COVID-19 symptoms appear to be less severe among pediatric patients, efforts to contain the virus may be motivated by community rather than personal motives. Thus, we propose that attitudes toward the severity of COVID-19 and community attachments will be especially relevant for adolescents' news monitoring, social distancing, disinfecting, and hoarding behaviors given that COVID-19 poses a lower personal threat to teenagers and larger threat to others.

## Methods

### Participants and Procedures

This study involved collecting a convenience sample of adolescents from the United States shortly after COVID-19 was

### Key Points

**Question** What are the psychological factors associated with adolescent pandemic-related behaviors during the early stages of the coronavirus disease 2019 outbreak in the United States?

**Findings** In this survey study of 770 adolescents, attitudes about the pandemic severity, social responsibility values, social trust, and self-interest were differentially associated with news monitoring, social distancing, disinfecting behaviors, and hoarding behavior.

**Meaning** Emphasizing the severity of the coronavirus disease 2019 pandemic and the social implications of pandemic-related behaviors may be important for teens in the United States.

declared a national emergency. Data for this study were collected from 8 AM on March 20 through 5 PM on March 22, 2020. This study involved no more than minimal risk, and thus passive parental consent was used. On selecting into the study, participants were given a link to a letter explaining the study and asked to provide this letter to their parents. All youth who provided informed written assent were invited to participate. Those who completed the initial survey were entered into a drawing for a \$250 Amazon gift card. This study was approved by the institutional review board at Montana State University and, where applicable, followed the American Association for Public Opinion Research (AAPOR) reporting guideline.

English-speaking adolescents aged 13 to 18 years who were US residents and had access to social media were eligible to participate in this study. This study was advertised on various social media platforms (Facebook, Instagram, Twitter, and Reddit). Participants self-selected into the study and completed a 10-minute survey. This method of recruitment was chosen for multiple reasons. First, the social implications of COVID-19 were quickly evolving during the time of recruitment, thus requiring data to be collected in a very short time. Second, state-mandated high school closures made community-based data collection unfeasible. Third, many online data collection platforms (eg, Mturk) do not provide access to adolescent participants, thus limiting the ability to collect data from a nationally representative sample.

### Measures

The survey instrument consisted of 31 items measuring COVID-19-related experiences, community attachments, and demographic questionnaires. Questions concerning COVID-19 experiences, including those assessing social distancing, disinfecting behavior, hoarding behavior, news monitoring, and COVID-19 severity attitudes, were created for this study. Questions concerning community attachments were taken from previously validated measures for adolescent samples,<sup>9</sup> and questions concerning demographic characteristics were taken from past research with adolescent samples.<sup>8</sup> The survey was pilot tested among the research team before data collection but was not pilot tested with adolescent participants to facilitate rapid data collection in response to the social changes that accompanied the COVID-19 pandemic. Cronbach  $\alpha$  scores are reported below

as an indicator of internal consistency for measures that contain multiple items, with  $\alpha > .60$  indicating acceptable reliability.<sup>10</sup> The survey instrument is publicly available on the OSF platform (Center for Open Science).<sup>11</sup>

#### Social Distancing

Social distancing was measured using 5 items ( $\alpha = .70$ ) developed for this study. Respondents indicated the frequency at which they spent time in person with friends, extended family, teachers, neighbors, and any other person who did not live with them in the past 7 days on a 5-point scale ranging from not at all (1 point) to very often (5 points). Items were reverse coded, and mean scores were calculated with higher values indicating greater social distancing.

#### Disinfecting Behaviors

Disinfecting behaviors were measured with 4 items ( $\alpha = .64$ ) developed for this study. Respondents indicated the frequency at which they used hand sanitizer, washed their hands, cleaned their phones, and used disinfecting wipes in the past 7 days on a 6-point scale ranging from not at all (1 point) to multiple times a day (6 points). Mean scores were calculated with higher values indicating greater disinfecting behavior.

#### Hoarding Behaviors

Hoarding behaviors were assessed with a single item that asked respondents how often they hoarded supplies from a grocery store or department store in the past 7 days. Responses were given on a 5-point scale ranging from not at all (1 point) to very often (5 points), with higher values indicating more hoarding behaviors.

#### COVID-19 News Monitoring

COVID-19 news monitoring was measured with a single item in which respondents rated the extent to which they followed news coverage of COVID-19 on a 5-point scale ranging from not at all (1 point) to a great deal (5 points). Higher values indicated greater COVID-19 news monitoring.

#### Attitudes About COVID-19 Severity

Attitudes about the severity of COVID-19 were measured with 4 items ( $\alpha = .80$ ) in which youth rated their agreement with statements de-emphasizing the severity of the virus (eg, "The coronavirus is just 'the flu.'"). Responses were given on a 7-point scale ranging from strongly disagree (1 point) to strongly agree (7 points). Responses were reverse coded, and mean scores were calculated with higher values indicating the attitude that COVID-19 is severe.

#### Social Responsibility Values

Social responsibility values were measured with 3 items ( $\alpha = .83$ ) in which respondents rated how important it is to consider the needs of other people, make sure that all people are treated fairly, and think about how their actions affect people in the future.<sup>9</sup> Responses were given on a 5-point scale ranging from not at all important (1 point) to extremely important (5 points). Mean values were calculated so that higher values indicated more social responsibility.

#### Social Trust

Social trust was measured with 3 items ( $\alpha = .82$ ) taken from past research<sup>7</sup> (ie, "Most people can be trusted," "Most people are fair," and "Most people are helpful"). Responses were given on a 7-point scale ranging from strongly disagree (1 point) to strongly agree (7 points). Mean scores were calculated with higher values indicating higher social trust.

#### Self-interest Values

Self-interest values were measured with 2 items ( $r = 0.30$ ) in which youth rated how important it is to put their own needs before the needs of others and to do what they want regardless of what other people might want.<sup>9</sup> Responses were given on a 5-point scale ranging from not at all important (1 point) to extremely important (5 points). Mean scores were calculated so that higher values indicated more self-interest.

#### Demographic Covariates

Adolescents reported their age, sex, race/ethnicity, parents' educational level, and family financial strain. Parents' educational level was recoded on a 3-point scale as neither parent completed high school (1), at least 1 parent completed high school (2), and at least 1 parent completed college (3). Participants also reported on their political ideology on a 5-point scale ranging from very conservative (1 point) to very liberal (5 points), with an option to indicate "I don't know."

#### Statistical Analysis

Multiple regressions were used to test the primary study hypotheses. For these analyses, social distancing, disinfecting behavior, COVID-19 news monitoring, and hoarding behavior were specified as the dependent variables, and attitudes about COVID-19 severity, social responsibility values, social trust, and self-interest values were specified as the primary independent variables. All models included adolescent sex, age, race (coded 1 for white and 0 for non-white), ethnicity (coded 1 for Hispanic and 0 for non-Hispanic), family financial strain, parents' educational level, and political ideology as covariates. Models were estimated using the `lm` function in the R statistical program, version 3.6.1.<sup>12</sup> Low levels of missing data (<6.5%) were estimated using multiple imputation. Effects with 2-sided  $\alpha < .05$  were considered to be statistically significant. The raw data used for the study are publicly available.<sup>11</sup>

## Results

The initial survey was completed by 789 adolescents residing in the United States and aged 13 to 18 years. Owing to the convenience sampling design, information regarding the response rate was unavailable. The mean (SD) age of the respondents was 16.3 (1.1) years. The sample primarily included 10th (156 [19.8%]), 11th (242 [30.7%]), or 12th (248 [31.4%]) graders, with fewer 9th graders (107 [13.6%]) and college students (31 [3.9%]). Five participants did not report their grade level. A small number of participants indicated that they were unaware of COVID-19 ( $n = 10$ ) or that their

school had not yet closed and thus strict social distancing was not possible (n = 9). These participants were removed from analyses, resulting in the final analytic sample of 770 respondents.

The sample consisted of more girls (575 [74.7%]) than boys (156 [20.3%]), with 39 (5.1%) identifying as nonbinary. The sample primarily self-identified as white (558 [72.5%]), followed by Hispanic/Latino (117 [15.2%]), African American or black (43 [5.6%]), Asian American/Pacific Islander (78 [10.1%]), American Indian/Alaska Native (24 [3.1%]), or other (23 [3.0%]). Participants could identify as multiple racial/ethnic identities, thus producing values greater than our sample size and 100%. As a proxy for family financial strain,<sup>13</sup> youths were asked whether their families had enough money to buy almost anything they wanted (54 [7.0%]), had no problem buying the things they needed and sometimes enough to buy special things (410 [53.2%]), had just enough money for the things they needed (245 [31.8%]), or had a hard time buying the things they needed (61 [7.9%]).

Means (SDs) and bivariate correlations among study variables as well as frequencies of news monitoring, social distancing, disinfecting, and hoarding behaviors during the 7 days after COVID-19 was declared a national emergency are presented in **Table 1** and **Table 2**. Overall, only 242 respondents (31.4%) engaged in pure social distancing (no in-person contact with those outside their household) compared with 528 (68.6%) who did not practice social distancing during this period. Respondents frequently engaged in various disinfecting behavior, with 676 (87.8%) reporting that they engaged in at least 1 type daily. In addition, a small subset of youths engaged in hoarding behaviors (152 [19.7%]) at least a little during this period. A small subset of youths (82 [10.6%]) indicated that they did not follow COVID-19-related news at all or just a little, with the remaining 688 (89.4%) following COVID-19 news at least somewhat.

**Table 3** and **Table 4** present estimates from 4 multivariate regression models for adolescents' social distancing, disinfecting, news monitoring, and hoarding behaviors. When examining social distancing and after accounting for demographic characteristics, youth who endorsed attitudes about the greater severity of COVID-19 engaged in greater social distancing ( $\beta = 0.18$ ; 95% CI = 0.10 to 0.25). In addition, greater self-interest values were associated with less social distancing ( $\beta = -0.08$ ; 95% CI =  $-0.15$  to  $-0.01$ ). When examining disinfecting behavior, youth who endorsed attitudes about the greater severity of COVID-19 ( $\beta = 0.16$ ; 95% CI = 0.08 to 0.23) and social responsibility values ( $\beta = 0.24$ ; 95% CI = 0.17 to 0.32) also engaged in increased disinfecting behaviors. Attitudes about the severity of COVID-19 ( $\beta = 0.26$ ; 95% CI = 0.18 to 0.33) and social responsibility values ( $\beta = 0.14$ ; 95% CI = 0.07 to 0.22) were also associated with more frequent news monitoring. When examining hoarding behavior, youth who endorsed attitudes about the greater severity of COVID-19 ( $\beta = 0.08$ ; 95% CI = 0.01 to 0.16) and those who endorsed greater self-interest values ( $\beta = 0.08$ ; 95% CI = 0.01 to 0.15) engaged in greater hoarding behavior, whereas those who endorsed greater social

**Table 1. Frequencies of Adolescents' Disinfecting Behaviors, Social Distancing, Hoarding, and News Monitoring**

Survey item	Respondents, No. (%) (n = 770)
<b>In the past 7 d, how often have you cleaned and disinfected surfaces in your home with antibacterial wipes?<sup>a</sup></b>	
Not at all	117 (15.2)
Once or twice	251 (32.6)
3 or 4 Times	170 (22.1)
5 or 6 Times	62 (8.1)
Daily	120 (15.6)
Multiple times a day	49 (6.4)
Missing	1 (0.1)
<b>In the past 7 d, how often have you used antibacterial hand sanitizer throughout the day?</b>	
Not at all	160 (20.8)
Once or twice	212 (27.5)
3 or 4 Times	134 (17.4)
5 or 6 Times	46 (6.0)
Daily	99 (12.9)
Multiple times a day	118 (15.3)
Missing	1 (0.1)
<b>In the past 7 d, how often have you cleaned your mobile phone?</b>	
Not at all	278 (36.1)
Once or twice	242 (31.4)
3 or 4 Times	114 (14.8)
5 or 6 Times	30 (3.9)
Daily	76 (9.9)
Multiple times a day	29 (3.8)
Missing	1 (0.1)
<b>In the past 7 d, how often have you washed your hands for at least 20 s?</b>	
Not at all	12 (1.6)
Once or twice	25 (3.2)
3 or 4 Times	42 (5.5)
5 or 6 Times	37 (4.8)
Daily	182 (23.6)
Multiple times a day	470 (61.0)
Missing	2 (0.3)
<b>In the past 7 d, how frequently have you spent time with friends in person?</b>	
Not at all	412 (53.5)
Once or twice	222 (28.8)
A few times	85 (11.0)
Often	27 (3.5)
Very often	23 (3.0)
Missing	1 (0.1)
<b>In the past 7 d, how frequently have you spent time with extended family members (who do not live with you) in person?</b>	
Not at all	546 (70.9)
Once or twice	153 (19.9)
A few times	49 (6.4)
Often	14 (1.8)
Very often	7 (0.9)
Missing	1 (0.1)
<b>In the past 7 d, how frequently have you spent time with others (eg, teachers or neighbors) in person?</b>	
Not at all	575 (74.7)
Once or twice	138 (17.9)
A few times	37 (4.8)

(continued)

**Table 1. Frequencies of Adolescents' Disinfecting Behaviors, Social Distancing, Hoarding, and News Monitoring (continued)**

Survey item	Respondents, No. (%) (n = 770)
Often	12 (1.6)
Very often	7 (0.9)
Missing	1 (0.1)
<b>In the past 7 d, how frequently have you spent time with someone else who does not live with you in person?<sup>a</sup></b>	
Not at all	316 (41.0)
Once or twice	271 (35.2)
A few times	114 (14.8)
Often	44 (5.7)
Very often	24 (3.1)
Missing	1 (0.1)
<b>In the past 7 d, how frequently have you hoarded supplies from a grocery or department store?</b>	
Not at all	618 (80.3)
Once or twice	98 (12.7)
A few times	31 (4.0)
Often	13 (1.7)
Very often	10 (1.3)
Missing	0
<b>To what extent are you following news coverage of the coronavirus, COVID-19?</b>	
Not at all	8 (1.0)
A little	74 (9.6)
Somewhat	227 (29.5)
Much	262 (34.0)
A great deal	199 (25.8)
Missing	0

Abbreviation: COVID-19, coronavirus disease 2019.

<sup>a</sup> Total scores indicated that a total of 676 respondents (87.8%) used at least 1 disinfecting method daily.

<sup>b</sup> Total scores indicated that a total of 242 (31.4%) did not spend time with any person outside of their household in the past 7 days.

trust ( $\beta = -0.09$ ; 95% CI =  $-0.16$  to  $-0.02$ ) and social responsibility ( $\beta = -0.07$ ; 95% CI =  $-0.14$  to  $-0.01$ ) values engaged in less hoarding behavior. Significant results are displayed in eFigures 1 and 2 in the [Supplement](#).

## Discussion

COVID-19 is an imminent public health concern. To manage the spread and social effects of this pandemic, it is imperative that US citizens engage in preventive behaviors, such as social distancing and personal hygiene, stay up to date on virus-related news, and limit their engagement in hoarding behaviors that can result in a shortage of resources for communities. Understanding individual differences in these behaviors is especially important among teenagers, who may be less likely to present with symptoms even when carrying the virus<sup>6</sup> and who may experience greater social pressure to avoid limiting social contact with peers. Findings from this study indicate that adolescents' beliefs about the severity of the virus, the extent to which they value social responsibility, their social trust, and their prioritization of their own self-interest over others were independently associated with their

news monitoring, social distancing, disinfecting, and hoarding behavior in the days after the United States declared COVID-19 a national emergency.

Results from this study have important implications for the social response in the United States to the COVID-19 pandemic. Adolescents' perceptions of COVID-19 severity were associated with greater social distancing, disinfecting, and news monitoring but also greater hoarding behavior with generally moderate effect sizes. These findings are consistent with past research that found that youth were more likely to engage in socially responsible environmental behaviors in historical years when they were more aware of environmental pollution issues.<sup>14</sup> Concern about social issues may motivate adolescents to act in socially responsible ways,<sup>15</sup> and these findings highlight the potential importance of ensuring that adolescents view the COVID-19 virus as a serious threat in a way that does not encourage hoarding. These efforts may be aided by informing adolescents about potential asynchronies between the effects of COVID-19 on adolescents vs adults.

We also found that increased social responsibility values were associated with greater disinfecting, less hoarding, and more news monitoring, whereas self-interest values were associated with less social distancing and more hoarding. Effect sizes for social responsibility were generally moderate, whereas effect sizes for self-interest appeared smaller. Social trust was also associated with less hoarding, with a small effect. Although these values may demonstrate considerable stability and may be slow to change, past research<sup>16</sup> has found that adolescents embraced social responsibility as a value to live by if they believed that the United States was a fair society. Directly targeting these psychological beliefs may be an effective medium to promote positive health behaviors. Findings from this study stress the importance of increasing adolescents' social responsibility values and decreasing self-interest values as a preventive measure for future pandemics and public health concerns.

## Limitations

Findings should be interpreted in the context of certain limitations. Data were cross-sectional, and causal or temporal interpretations cannot be made. Community attachments may encourage prosocial responding to the COVID-19 pandemic. However, COVID-19 attention and engagement in these prosocial behaviors may also promote greater social responsibility, higher social trust, and less self-interest. Future research is needed to examine within-person, longitudinal associations between community attachments and COVID-19 behaviors. Although our sample was recruited from across the United States, participants self-selected into this study via social media, which may be prone to selection bias. Further, respondents were primarily white and female, which may limit the generalizability of our findings. Future studies would benefit from examining social distancing motivation in a more diverse sample of adolescents. Although approximately 1 in 5 respondents reported hoarding to some extent in the days after COVID-19 was declared a national emergency, it is unclear whether they were hoarding with a family member, for a family member, or for

Table 2. Means and Correlations for All Study Variables

Variable (No.)	Mean (SD)	Variable No., correlation													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
Sex (1)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Age, y (2)	16.3 (1.10)	-0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
White (3)	NA	-0.00	-0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hispanic (4)	NA	-0.06	0.07 <sup>a</sup>	-0.28 <sup>b</sup>	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Financial strain (5) <sup>c</sup>	2.59 (0.73)	-0.02	0.01	0.10 <sup>b</sup>	-0.18 <sup>b</sup>	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Parent educational level (6) <sup>d</sup>	2.59 (0.68)	0.01	0.03	0.19 <sup>b</sup>	-0.19 <sup>b</sup>	0.30 <sup>b</sup>	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ideology (7) <sup>e</sup>	3.64 (1.05)	0.12 <sup>b</sup>	-0.00	0.03	-0.08 <sup>a</sup>	0.04	0.07	NA	NA	NA	NA	NA	NA	NA	NA
Social responsibility (8) <sup>f</sup>	4.26 (0.72)	0.13 <sup>b</sup>	0.04	0.07 <sup>a</sup>	0.02	-0.02	0.06	0.17 <sup>b</sup>	NA	NA	NA	NA	NA	NA	NA
COVID-19 attitudes (9) <sup>g</sup>	5.13 (1.28)	0.09 <sup>a</sup>	0.11 <sup>b</sup>	0.03	-0.05	0.10 <sup>b</sup>	0.11 <sup>b</sup>	0.25 <sup>b</sup>	0.31 <sup>b</sup>	NA	NA	NA	NA	NA	NA
Social trust (10) <sup>g</sup>	3.92 (1.24)	-0.01	0.06	0.01	-0.08 <sup>a</sup>	0.08 <sup>a</sup>	0.12 <sup>b</sup>	0.01	0.12 <sup>b</sup>	0.06	NA	NA	NA	NA	NA
Self-interest (11) <sup>f</sup>	2.57 (0.88)	0.01	0.01	-0.11 <sup>b</sup>	0.06	-0.08 <sup>a</sup>	-0.02	-0.10 <sup>b</sup>	-0.11 <sup>b</sup>	-0.09 <sup>a</sup>	-0.02	NA	NA	NA	NA
Self-distancing (12) <sup>h</sup>	4.39 (0.65)	0.13 <sup>b</sup>	-0.02	-0.13 <sup>b</sup>	-0.00	0.04	0.00	0.13 <sup>b</sup>	0.10 <sup>b</sup>	0.21 <sup>b</sup>	0.03	-0.09 <sup>a</sup>	NA	NA	NA
Disinfecting (13) <sup>i</sup>	3.41 (1.02)	0.09 <sup>b</sup>	0.09 <sup>a</sup>	-0.02	0.10 <sup>b</sup>	0.03	-0.02	0.03	0.28 <sup>b</sup>	0.22 <sup>b</sup>	-0.02	0.02	0.03	NA	NA
Hoarding (14) <sup>j</sup>	1.31 (0.74)	0.01	-0.03	-0.12 <sup>b</sup>	0.05	-0.00	-0.03	0.03	-0.07	0.05	-0.10 <sup>b</sup>	0.09 <sup>a</sup>	0.00	0.01	NA
News monitoring (15) <sup>k</sup>	3.74 (0.98)	0.03	0.01	-0.02	0.06	-0.07	-0.04	0.03	0.21 <sup>b</sup>	0.27 <sup>b</sup>	-0.01	-0.04	0.11 <sup>b</sup>	0.27 <sup>b</sup>	0.12 <sup>b</sup>

Abbreviations: COVID-19, coronavirus disease 2019; NA, not applicable.

<sup>a</sup> P < .05, calculated using 2-tailed bivariate correlations.

<sup>b</sup> P < .01, calculated using 2-tailed bivariate correlations.

<sup>c</sup> Scores ranged from 1 (having a hard time buying the things the family needs) to 4 (having enough money to buy almost anything the family wants), with higher scores indicating lower financial strain.

<sup>d</sup> Scored as neither parent completed high school (1), at least 1 parent completed high school (2), and at least 1 parent completed college (3).

<sup>e</sup> Scored from very conservative (1 point) to very liberal (5 points) with an option to indicate "I don't know."

<sup>f</sup> Scores ranged from not at all important (1 point) to extremely important (5 points).

<sup>g</sup> Scores ranged from strongly disagree (1 point) to strongly agree (7 points).

<sup>h</sup> Scores ranged from not at all (1 point) to very often (5 points) for the frequency at which they spent time in person with friends, extended family, teachers, neighbors, and any other person who did not live with them in the past 7 days.

<sup>i</sup> Scores ranged from not at all (1 point) to multiple times a day (6 points).

<sup>j</sup> Scores ranged from not at all (1 point) to very often (5 points).

<sup>k</sup> Scores ranged from not at all (1 point) to a great deal (5 points).

Table 3. Regression Models Testing Psychological Factors Associated With Adolescent Social Distancing and Disinfecting During COVID-19<sup>a</sup>

Factor	Social distancing <sup>b</sup>			Disinfecting behaviors <sup>c</sup>		
	Unstandardized regression coefficient, B (SE)	β Estimate (95% CI)	P value <sup>d</sup>	Unstandardized regression coefficient, B (SE)	β Estimate (95% CI)	P value <sup>d</sup>
Intercept	4.03 (0.38)	-0.00 (-0.07 to 0.07)	>.99	0.30 (0.59)	-0.00 (-0.07 to 0.07)	>.99
Female	0.17 (0.06)	0.11 (0.04 to 0.18)	<.001	0.15 (0.09)	0.06 (-0.01 to 0.13)	.08
Age	-0.02 (0.02)	-0.04 (-0.11 to 0.03)	.23	0.05 (0.03)	0.06 (-0.01 to 0.12)	.10
White	-0.24 (0.06)	-0.16 (-0.23 to -0.08)	<.001	-0.02 (0.09)	-0.01 (-0.08 to 0.06)	.82
Hispanic	-0.02 (0.06)	-0.01 (-0.09 to 0.06)	.75	0.26 (0.10)	0.09 (0.02 to 0.17)	.01
Family financial strain	0.03 (0.03)	0.03 (-0.04 to 0.10)	.38	0.09 (0.05)	0.07 (-0.01 to 0.14)	.07
Parents' educational level	-0.01 (0.04)	-0.01 (-0.08 to 0.07)	.85	-0.07 (0.05)	-0.04 (-0.12 to 0.03)	.23
Ideology	0.04 (0.02)	0.07 (-0.00 to 0.14)	.07	-0.05 (0.03)	-0.05 (-0.12 to 0.02)	.17
COVID-19 severity	0.09 (0.02)	0.18 (0.10 to 0.25)	<.001	0.13 (0.03)	0.16 (0.08 to 0.23)	<.001
Social responsibility	0.02 (0.03)	0.02 (-0.05 to 0.10)	.53	0.34 (0.05)	0.24 (0.17 to 0.32)	<.001
Social trust	0.01 (0.02)	0.02 (-0.05 to 0.09)	.65	-0.04 (0.03)	-0.05 (-0.12 to 0.02)	.13
Self-interest	-0.06 (0.03)	-0.08 (-0.15 to -0.01)	.02	0.06 (0.04)	0.05 (-0.02 to 0.12)	.13

Abbreviation: COVID-19, coronavirus disease 2019.

<sup>a</sup> Includes 770 survey respondents.

<sup>b</sup> R<sup>2</sup> = 0.094; adjusted R<sup>2</sup> = 0.081.

<sup>c</sup> R<sup>2</sup> = 0.128; adjusted R<sup>2</sup> = 0.115.

<sup>d</sup> Calculated using multiple regressions.

themselves. In addition, disinfecting behaviors were measured with only 4 items, and the scale had low internal consistency. Future research would benefit from assessing the

context surrounding adolescent hoarding behavior and from the inclusion of a wider range of disinfecting behaviors.

Table 4. Regression Models Testing Psychological Factors Associated With Adolescent Hoarding and News Monitoring Behaviors During COVID-19<sup>a</sup>

Factor	News monitoring <sup>b</sup>			Hoarding behaviors <sup>c</sup>		
	Unstandardized regression coefficient, B (SE)	$\beta$ Estimate (95% CI)	P value <sup>d</sup>	Unstandardized regression coefficient, B (SE)	$\beta$ Estimate (95% CI)	P value <sup>d</sup>
Intercept	2.94 (0.58)	0.00 (−0.07 to 0.07)	>.99	1.75 (0.45)	−0.00 (−0.07 to 0.07)	>.99
Female	−0.02 (0.08)	−0.01 (−0.08 to 0.06)	.82	0.02 (0.07)	0.01 (−0.06 to 0.08)	.78
Age	−0.02 (0.03)	−0.02 (−0.09 to 0.04)	.48	−0.02 (0.02)	−0.03 (−0.10 to 0.04)	.36
White	−0.02 (0.09)	−0.01 (−0.08 to 0.06)	.80	−0.19 (0.07)	−0.10 (−0.18 to −0.03)	.01
Hispanic	0.11 (0.10)	0.04 (−0.03 to 0.11)	.27	0.05 (0.08)	0.02 (−0.05 to 0.10)	.53
Family financial strain	−0.09 (0.05)	−0.07 (−0.14 to 0.00)	.06	0.02 (0.04)	0.02 (−0.06 to 0.09)	.66
Parents' educational level	−0.05 (0.05)	−0.04 (−0.11 to 0.04)	.34	−0.01 (0.04)	−0.01 (−0.08 to 0.07)	.86
Ideology	−0.04 (0.03)	−0.05 (−0.12 to 0.03)	.21	0.02 (0.03)	0.03 (−0.04 to 0.11)	.36
COVID-19 severity	0.20 (0.03)	0.26 (0.18 to 0.33)	<.001	0.05 (0.02)	0.08 (0.01 to 0.16)	.04
Social responsibility	0.20 (0.05)	0.14 (0.07 to 0.22)	<.001	−0.08 (0.04)	−0.07 (−0.14 to −0.01)	.04
Social trust	−0.02 (0.03)	−0.03 (−0.10 to 0.04)	.42	−0.05 (0.02)	−0.09 (−0.16 to −0.02)	.01
Self-interest	−0.02 (0.04)	−0.02 (−0.08 to 0.05)	.66	0.07 (0.03)	0.08 (0.01 to 0.15)	.03

Abbreviation: COVID-19, coronavirus disease 2019.

<sup>c</sup>  $R^2 = 0.041$ ; adjusted  $R^2 = 0.027$ .<sup>a</sup> Includes 770 survey respondents.<sup>d</sup> Calculated using multiple regressions.<sup>b</sup>  $R^2 = 0.107$ ; adjusted  $R^2 = 0.094$ .

## Conclusions

Overall, our findings highlight that adolescents' beliefs about COVID-19 and community attachments may represent important attitudes and psychological factors that inform their response to the COVID-19 pandemic. Future research is needed to monitor changes in adolescents' attitudes about COVID-19 and commu-

nity attachments as the pandemic unfolds. Consistent with developmental theory,<sup>16</sup> these efforts would benefit from characterizing heterogeneity in trajectories of change and identifying subpopulations of adolescents who demonstrate more rapid changes in community attachments, attitudes about COVID-19, and COVID-19 behaviors over time. Such efforts may help in tailoring efficacious interventions for improving the COVID-19 pandemic response.

### ARTICLE INFORMATION

**Accepted for Publication:** April 23, 2020.

**Published Online:** June 29, 2020.

doi:10.1001/jamapediatrics.2020.1876

**Author Contributions:** Dr Oosterhoff had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

**Concept and design:** Both authors.

**Acquisition, analysis, or interpretation of data:** Both authors.

**Drafting of the manuscript:** Both authors.

**Critical revision of the manuscript for important intellectual content:** Both authors.

**Statistical analysis:** Both authors.

**Obtained funding:** Oosterhoff.

**Administrative, technical, or material support:** Oosterhoff.

**Supervision:** Oosterhoff.

**Conflict of Interest Disclosures:** None reported.

**Funding/Support:** This study was supported by the Center for American Indian and Rural Health Equity (CAIRHE) (Dr Oosterhoff).

**Role of the Funder/Sponsor:** Funding from CAIRHE was used to support the design and the conduct of the study. The sponsor had no role in the collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; and decision to submit the manuscript for publication.

### REFERENCES

1. World Health Organization. Published disease 2019 (COVID-19) situation report–62. Posted March 21, 2020. Accessed March 22, 2020. [https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200322-sitrep-62-covid-19.pdf?sfvrsn=f7764c46\\_2](https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200322-sitrep-62-covid-19.pdf?sfvrsn=f7764c46_2)

2. Centers for Disease Control and Prevention. Coronavirus disease 2019 (COVID-19): cases in US. Updated May 13, 2020. Accessed March 22, 2020. <https://www.cdc.gov/coronavirus/2019-ncov/cases-updates/cases-in-us.html>

3. Centers for Disease Control and Prevention. Coronavirus disease 2019 (COVID-19): situation summary. Updated April 19, 2020. Accessed March 22, 2020. <https://www.cdc.gov/coronavirus/2019-ncov/cases-updates/summary.html>

4. World Health Organization. Coronavirus. Updated March 20, 2020. Accessed March 22, 2020. [https://www.who.int/health-topics/coronavirus#tab=tab\\_2](https://www.who.int/health-topics/coronavirus#tab=tab_2)

5. Smetana JG, Campione-Barr N, Metzger A. Adolescent development in interpersonal and societal contexts. *Annu Rev Psychol*. 2006;57:255-284. doi:10.1146/annurev.psych.57.102904.190124

6. Dong Y, Mo X, Hu Y, et al. Epidemiology of COVID-19 among children in China. *Pediatrics*. Published online March 16, 2020. doi:10.1542/peds.2020q0-0702

7. Wray-Lake L, Maggs JL, Johnston LD, Bachman JG, O'Malley PM, Schulenberg JE. Associations between community attachments and adolescent substance use in nationally representative samples. *J Adolesc Health*. 2012;51(4):325-331. doi:10.1016/j.jadohealth.2011.12.030

8. Metzger A, Alvis LM, Oosterhoff B, Babskie E, Syvertsen A, Wray-Lake L. The intersection of emotional and socio-cognitive competencies with civic engagement in middle childhood and adolescence. *J Youth Adolesc*. 2018;47(8):1663-1683. doi:10.1007/s10964-018-0842-5

9. Syvertsen AK, Wray-Lake L, Metzger A. *Youth Civic and Character Measures Toolkit*. Search Institute; 2015.

10. Ursachi G, Horodnic IA, Zait A. How reliable are measurement scales? external factors with indirect influence on reliability estimators. *Procedia Econ Finance*. 2015;20:679-686. doi:10.1016/S2212-5671(15)00123-9

11. Oosterhoff B. Attitudes and psychological factors associated with news monitoring, social distancing, disinfecting, and hoarding behaviors among US adolescents during the COVID-19 pandemic. Posted April 21, 2020. Accessed April 21, 2020. <https://www.osf.io/yk9vt/>

12. *R Foundation for Statistical Computing. R: A language and environment for statistical computing*. R Foundation for Statistical Computing; 2013. Updated April 24, 2020. Accessed March 22, 2020. <http://www.R-project.org>

13. Galinsky E. *Ask the Children: What America's Children Really Think About Working Parents*. Morrow; 1999.

14. Wray-Lake L, Flanagan CA, Osgood DW. Examining trends in adolescent environmental attitudes, beliefs, and behaviors across three decades. *Environ Behav*. 2010;42(1):61-85. doi:10.1177/0013916509335163

15. Oosterhoff B, Wray-Lake L, Palmer CA, Kaplow JB. Historical trends in concerns about social issues across four decades among US adolescents. *J Res Adolesc*. 2020;30(suppl 2):485-498. doi:10.1111/jora.12493

16. Wray-Lake L, Syvertsen AK, Flanagan CA. Developmental change in social responsibility during adolescence: an ecological perspective. *Dev Psychol*. 2016;52(1):130-142. doi:10.1037/dev0000067