ABSTRACT OF THE THESIS

The Impact of Daily News Exposure on Mental Health during the COVID-19 Pandemic:
An Ecological Momentary Assessment Study

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Exposure to distressing news media can have negative effects on mental health. The widespread news coverage of the ongoing COVID-19 crisis may be deleterious for mental health, particularly among college students with limited access to social support and coping resources during social distancing. The current study examines the impact of daily exposure to news about COVID-19 on same-day and next-day mental health among college students in the first months of the pandemic. 128 college students completed daily smartphone-delivered surveys assessing frequency of exposure to news about the pandemic, worry and optimism specifically related to COVID-19, hopelessness, and general worry. Multilevel mediation models indicated that greater exposure to daily news about COVID-19 was associated with greater worry about the pandemic, which in turn was associated with higher levels of hopelessness and general worry in the same day. Effects persisted across the next day, with COVID-worry mediating the relationship between greater COVID news exposure and next-day general worry and hopelessness.
Optimism about COVID-19 was not related to amount of pandemic-related news consumed, hopelessness, or general worry. This study demonstrates the mental health impact of daily exposure to news about COVID-19 and highlights how pandemic-related worry generalizes to same-day and next-day hopelessness and general worry.
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Introduction

The coronavirus pandemic has cause widespread disruption and tragedy and represents an ongoing source of stress and worry. Undergraduate college students may be particularly vulnerable to the stress, uncertainty, and disruption posed by the pandemic. In the spring of 2020, over 1,000 colleges and universities across the United States transitioned from in-person to online classes due to concerns about the spread of coronavirus (Hess, 2020). As campuses abruptly closed, over 14 million undergraduate students were affected by a sudden transition to remote learning and millions were displaced from on-campus housing. This displacement coincided with early stay-at-home and shelter-in-place ordinances, signifying an abrupt transition period where millions of young adults were uprooted from their living environment and cut off from existing in-person social networks.

Research on mental health among college students in the early weeks of stay-at-home orders indicates that, in addition to difficulties adjusting to new living and social environments, students were disproportionately affected by uncertainty about the future consequences of the pandemic (Cao et al., 2020). Uncertainty about successfully completing and graduating from college as well as uncertainty about future employment opportunities were primary sources of stress reported by college students across 62 countries in early 2020 (Aristovnik et al., 2020). These and other stressors associated with quarantine and limited social interaction further amplify stress and anxiety among a group who even prior to the pandemic reported rapidly increasing rates of mental health problems, including anxiety, depression, and substance use compared to general adult
samples (Cao et al., 2020; E. M. Kleiman et al., 2020; Lipson et al., 2019). With stay-at-home orders in place and reduced access to hobbies and typical outlets for coping with stress, many young adults turned to media and news for information about the pandemic and as a means of distracting from distressing emotions (Eden et al., 2020).

**Media and crisis**

Existing research suggests that people turn to media outlets to help relax and cope with anxiety during periods of elevated stress, particularly when access to other coping resources is limited (Hofer & Eden, 2020; Mares & Cantor, 1992; Reinecke, 2009; Reinecke & Rieger, 2020). Furthermore, individuals with limited opportunity for social interaction and relationship-building are more likely to utilize media for social support and connection (Hofer & Eden, 2020). Literature on coping supports the efficacy of emotion-focused coping over problem-focused coping during stressful situations over which an individual has low control (Juth et al., 2015; Terry & Hynes, 1998). Beyond the utilization of media as a coping tool during significant life disruptions, people may engage with news and media specifically about the disruption (i.e., COVID-19) to gather information and increase feelings of safety (Stainback et al., 2020).

The stressors of the pandemic did not exist in a vacuum and existing political and social tension in the United States may have further contributed to a widespread sense of upheaval in the early months of the coronavirus outbreak. Theories on mass media dependency suggest that there is a greater need to gather information and try to make sense of uncertain circumstances during periods of severe social upheaval or widespread social change (Ball-Rokeach & DeFleur, 1976). Mass media (i.e., national news) is perceived as the most effective source to reduce anxiety and worry prompted by the
uncertainty of social disruption, but young adults increasingly turn to secondary sources (e.g., social media) for news updates (Lowrey, 2004; Morning Consult, 2020). Crisis situations prompt information seeking behavior across a variety of news and media sources, corresponding to an increase in overall news consumption and exposure during the pandemic (P. L. Liu, 2020).

**Media and news consumption during COVID-19**

On March 11, 2020, the World Health Organization officially declared COVID-19 a pandemic, and stay-at-home orders soon went into effect around the United States. For many people, the sudden transitions to sheltering in place and working from home increased access to and time spent engaging with news and other media, leading to substantial increases in widespread consumption of COVID-19-related media. Weekly visits to American news websites increased 68% from the prior month, with approximately 630 million visitors the week after the pandemic was declared (Sarault, 2020). Across the last three weeks of March, TV news, which remains the most popular source of news in the United States, viewership doubled from the same time period in 2019 (J. P. Morgan, 2020). Compared to March 2019, the use of mobile devices to monitor news updates rose an estimated 215% (Nielsen, 2020; Ohme et al., 2020).

American adults have relied heavily on multiple sources of information for updates on the pandemic. Mitchell and colleagues (2020) found that, among a nationally representative sample of American adults, 87% reported closely monitoring news about the pandemic for updates with nearly half of participants turning to news sources other than national news or media. The same survey found that 43% of the sample reported feeling worse after consuming news about COVID-19 and over 70% reported needing to
take breaks from the news to maintain mental health. Changing technology, including expanded mediums and sources through which people engage with news, has led to near-constant access and exposure to news updates and information about the pandemic (Ohme et al., 2020). Between notifications and the prevalence of sharing news across various social media platforms, millions of people are exposed to headlines and news stories during their day even when not actively seeking information or intentionally engaging with news media. Results from a national media tracking poll conducted in March 2020 indicated that a higher proportion of young adults engage daily with news via social media than via any other source (e.g., network news, online news sites; (Morning Consult, 2020). The rapidly evolving landscape of news dissemination supports the need to examine incidental and indirect exposure to news and media about distressing topics in addition to traditional news engagement and information seeking behaviors.

**Impact on mental health**

While consuming news and other forms of media may be intended to reduce anxiety surrounding a disruptive pandemic, more exposure to news about COVID-19 and more engagement with social media in general may be associated with detrimental mental health outcomes (Amundsen et al., 2021; Bendau et al., 2020; Eden et al., 2020; C. Liu & Liu, 2020; Stainback et al., 2020). Over the past decades, naturalistic and experimental research where participants are randomized to different news exposure conditions have found a consistent relationship between watching distressing news and decreased emotional wellbeing (Hoog & Verboon, 2020; McNaughton-cassill, 2001). Even brief exposure to television newscasts about negatively valenced content (e.g., watching 15-minute-long news clips) can increase negative affective states, including anxious and sad
mood immediately following the news exposure (Johnston & Davey, 1997; Szabo & Hopkinson, 2007). These changes in mood persisted even after participants engaged in an unrelated, distracting task following exposure to the news, suggesting that the affective impact of exposure to news extends beyond in-the-moment fluctuations during exposure (Szabo & Hopkinson, 2007). Research on the impact of engaging with news about community-wide tragedies or distressing events (e.g., violence, crime in a community) has found that high levels of exposure to news coverage of upsetting events are associated with elevated anxiety and worry (Garfin, Silver, & Holman, 2020; Mcnaughton-cassill, 2000; Thompson, Garfin, Holman, & Silver, 2017).

Trauma researchers have proposed a vicarious trauma effect through which news coverage can become a source of collective trauma, leading to trauma-related symptoms even for individuals not directly affected by the incident (Garfin et al., 2020; C. Liu & Liu, 2020). In the week following the 2013 Boston Marathon bombings, individuals who reported high daily levels of exposure to media coverage of the bombings experienced greater acute stress than individuals at the marathon who were directly exposed to the bombings (Holman et al., 2014). This effect was found across various types of news sources and mediums, including print, radio, television news, and social media posts. As mobile technology and social media become more integrated into daily life, the speed and scope of news dissemination has creating avenues for localized tragedies to quickly generalize into widespread collective stressors through constant exposure to distressing media coverage. Within days of the Boston Marathon bombing, individuals living in other states who consumed extensive news coverage of the bombings experienced similar elevations in distress and impaired functioning (Holman et al., 2014). Much of the
research on how extensive media coverage of distressing events can confer risk for collective trauma symptoms has focused on the news cycle following individual, discrete tragic events. However, repeated indirect exposure to collective trauma through news media consumption may increase vulnerability to the deleterious mental health impact of future community tragedies (Garfin et al., 2015; Thompson et al., 2019).

This escalating cycle of distress, particularly in the context of multiple, consecutive traumatic events, may be partially driven by individuals seeking additional information in an attempt to reduce uncertainty and cope with anxiety about current and future threats. Research by Johnston & Davey (1997) indicates that worry prompted by news consumption generalizes to worried cognitive patterns that involve topics beyond what was covered in the distressing media. This study found that brief exposure to negative TV news enhances the tendency to “catastrophize” unrelated personal worries such that individuals are more likely to imagine and expect worst-case scenarios and outcomes for personal future events. The process through which worried responses to distressing media generalizes to broader worried thoughts patterns is not yet understood, nor are the mechanisms that catalyze the generalization from specific to general distress. Outside of controlled experiments, much of the extant literature on daily news exposure and mental health has utilized retrospective cross-sectional and longitudinal methodologies using single weekly assessments where participants are asked to estimate frequency and duration of news exposure across various media platforms. With the ubiquity of daily social media use, individuals are likely exposed to headlines and articles about distressing topics even when they are not actively seeking to engage with news. The impact of daily, momentary exposures on affect and stress may not be captured by
retrospective surveys and may be particularly relevant during COVID-19 with increased
daily use of various forms of media.

**Misinformation and uncertainty in COVID-19 news**

Media coverage of COVID-19 may be particularly relevant for mental health in ways
that distinguish the pandemic from previous collective tragedies. COVID-19 is an
ongoing crisis which as of April 2021 has killed over 500,000 people in the United States
alone (Bosman, 2021). In contrast to previous literature that has focused on news
coverage following a discrete, distressing event, COVID-19 represents an ongoing crisis
and much of the coverage has focused on current and future threat rather than on a single
past or series of past events (Stainback et al., 2020). The continued presence of COVID-
19 has led to an extended period of widespread uncertainty about safety, the economy,
the future, and the virus itself. This uncertainty is compounded by the proliferation of
misinformation and unreliable sources as the pandemic is information about the
pandemic naturally increases and is arbitrarily politicized (P. L. Liu, 2020; Mitchell et al.,
2020; Wang et al., 2019). In April 2020, approximately 50% of American adults in a
nationally representative survey reported difficulty determining what information about
COVID-19 that they read or saw in the media was true (Mitchell et al., 2020).

Changes in commonly used technology and social network platforms (i.e., social
media) have changed the way that information is disseminated and accessed. Information
that has not been verified can be more rapidly disseminated and reach a greater audience
through various social media platforms than at any time in history. A systematic review
conducted in 2019 indicated that health misinformation was widely shared across social
media and received a great deal of popular engagement from individuals who were
unaware that the health information was inaccurate or misleading (Wang et al., 2019). Uncertainty about the pandemic may prompt individuals to seek clarifying information online, but given the range of contradictory, easily accessible “news” and “facts” about COVID-19, seeking information through the news may increase uncertainty, leading to feeling overwhelmed, confused, and increasingly worry about the pandemic (Bendau et al., 2020; P. L. Liu, 2020).

**Impact of exposure to news about COVID-19**

Media coverage of the coronavirus pandemic may be uniquely harmful for mental health. While engaging with social media for connection, social support, and distraction can help reduce worried thoughts and other anxious symptoms, the ubiquity of COVID-related media across various platforms meant that for many people engaging with social media automatically meant more COVID-news exposure (Eden et al., 2020; Kuiken & Oliver, 2013; Nabi et al., 2017; Reinecke & Eden, 2017). During the uncertainty in the first months of the pandemic as stricter lockdown procedures were set in place and the deathrate began to climb, exposure to media coverage of the worsening pandemic amplified distress for many rather than providing feelings of safety or agency to combat the virus (Stainback et al., 2020). Difficulty escaping the wall-to-wall coverage of the pandemic limits the efficacy of online and media-related coping methods, depleting already-strained access to typical coping strategies during a period of elevated distress.

As COVID-19 and safety precautions affect the world, recent research in the United States and abroad has begun to reveal the deleterious effects of exposure and consumption of media related to the pandemic. A nationally representative, cross-sectional survey found that consuming news about COVID-19 was associated with
greater psychological distress in the week following the implementation of stay-at-home in the United States (Stainback et al., 2020). Individuals who reported following the news very closely reported significantly more distress than those who reported less engagement. Increases in distress were closely related to increases in perceived threat of the virus following news consumption, indicating that watching news related to COVID-19 may increase worry about an uncertain future rather than decreasing uncertainty (Amundsen et al., 2021; Liu, 2020; Nekliudov et al., 2020). Greater exposure to COVID-media across various platforms is associated with higher levels of both general anxiety and anxiety specifically about COVID-19 (Bendau et al., 2020). Individuals who viewed COVID-19 news more frequently, for longer durations, and across multiple platforms reported the most severe increases in anxious symptoms as well as a greater number of depressive symptoms (Bendau et al., 2020).

International research indicates that while exposure to COVID-news is associated with greater anxiety and worry across various news platforms, engaging with coverage of the pandemic via social media and other unofficial news sources predicted greater increases in anxiety symptoms than watching news on official platforms (e.g., government websites, websites used by health organizations; Liu, 2020). Bendau and colleagues (2020) found that individuals who primarily seek information via official sources reported less general anxiety and fewer depressive symptoms than those who primarily utilized unofficial news sources. However, greater engagement with news was similarly related to COVID-specific anxiety regardless of platform or media source. The relationship and differences between the effects of news consumption on general worry and worry specifically related to COVID-19 and the outcomes of the pandemic is not yet
understood. Further, the existing research on COVID-19 media consumption and mental health is primarily cross-sectional and the influence of daily news exposure over time remains unclear.

Present Research

The present research uses real-time monitoring to examine the impact of daily exposure to news about COVID-19 on mental health among undergraduate college students. Data was collected during the early months of the pandemic, a period of significant disruption and adjustment for displaced students.

Research questions

What is the impact of daily exposure to news about COVID-19 on mental health?

Daily levels of worry and optimism specifically about the coronavirus outbreak among undergraduate students were assessed over an 8-week period in the early months of the pandemic. Previous research conducted with undergraduate students indicates that COVID-specific worry and anxiety are significantly higher than general, non-specific anxious feelings (E. M. Kleiman et al., 2020). As the toll of the pandemic escalated in Spring and early Summer 2020, news detailing the extent of the tragedy and points of remaining uncertainty about the ongoing crisis may directly increase worry about the current and future effects of COVID-19. Multiple news outlets have speculated that consumption of media related to COVID-19 may increase hopelessness, but this assertion has not yet been empirically evaluated (Brooks, 2020; Brown, 2020). By Beck’s definition, hopelessness is marked by negative expectations for the future as well as pessimistic cognitive schemas (Brooks, 2020; Brown, 2020). Economic and media
research have indicated that coverage of the pandemic in American news outlets is uniquely pessimistic compared to international media reports, with over 90% of news stories circulated by major outlets presented with negative tone and verbiage (Sacerdote et al., 2020). American news consumers were also more likely to opt for negatively valenced stories and news headlines. We hypothesized that greater daily exposure to media and news about COVID-19 will lead to increased worry and decreased optimism specifically about the COVID-19 pandemic.

**What are mechanisms through which exposure to news about COVID-19 leads to increased mental health issues?**

Over the same 8-week period, we examined momentary levels of hopelessness and general worry. Watching distressing news about a specific topic increases both worry about that topic and can generalize over time, leading to broad increases in worry and catastrophic thinking patterns (Johnston & Davey, 1997). Given that the pandemic and associated restrictions across multiple domains (e.g., social distancing, unemployment rates) have affected multiple facets of everyday life, we speculated that pessimism specifically about COVID-19 would lead to increases in broader, unspecific hopelessness. Building upon our first hypothesis, we expected that greater daily exposure to media and news about COVID-19 would lead to increased worry and decreased optimism specifically about the COVID-19 pandemic, which would then generalize to general worry and hopelessness.
Method

Participants & Procedure

Data are drawn from an ongoing study assessing stress, emotion, and behavior among a general college student sample (Kleiman et al., 2020). Participants included in the present research were recruited remotely via the undergraduate psychology research pool and large, introductory psychology courses at a large, public university. Recruitment took place in April and May 2020 while stay-at-home orders were in place. Eligible individuals were age 18 or older, had access to a smartphone compatible with the EMA survey software, and were willing to complete multiple surveys per day across the study period. Upon completion of a brief screener assessing these three eligibility criteria, participants were compensated $15 to complete an online baseline assessment. Baseline measures included demographic information (e.g., race, gender) and additional mental health and social variables that are not discussed in this manuscript. Participants were then provided instructions for downloading MetricWire, a smartphone app used to deliver EMA surveys during the next stage of the study.

EMA Surveys. Via the MetricWire app, participants completed 6 daily ecological momentary assessment (EMA) surveys each day for 8 weeks. 5 daily surveys were delivered at random times throughout the day to capture a range of real-time responses. Surveys were brief (under 5 minutes) and asked participants to report their in-the-moment feelings (i.e., “Right now, how much do you feel…”) across a range of affect states (e.g., excited, sad, angry) on a 0 (Not at all) to 10 (Very much) scale. Given the brevity of the surveys, single items commonly used in EMA research were used for each affect label. Hopelessness and general worry were assessed at the momentary level using
single item questions. Each EMA survey also included a question related to worry specifically about the COVID-19 pandemic (i.e., “How worried or anxious are you about the coronavirus outbreak?”) with answers ranging from 0 (Not at all) to 5 (Very much).

The sixth and final survey delivered each night of the study period included additional daily diary items asking participants to reflect back across the day. Nightly surveys included a single-item assessment of optimism about the COVID-19 pandemic (i.e., “What best describes how optimistic you feel about the coronavirus outbreak?”), which was rated on a 0 (very pessimistic) to 5 (very optimistic) scale. Finally, the nightly survey asked participants to share the frequency with which they were exposed to news about COVID-19 across the day (i.e., “How frequently did you see or read news or media about coronavirus today?”) that was rated on a scale from 0 (Not at all) to 5 (Very much).

Analytic Strategy

Since optimism about the coronavirus outbreak and exposure to COVID-news were assessed once per day, momentary variables of interest (i.e., hopelessness, general worry, and worry specifically about COVID-19) were aggregated to create daily average scores for each variable for each participant. Individual surveys were excluded from present analyses if the same response was given across all affect labels (including contradicting labels such as happy/sad and energetic/tired) and if there was no variability within survey responses (SD = 0 across all variables scored on a likert scale). Participants who recorded fewer than 3 days of data during the EMA period of the study were excluded from present analyses, yielding a final sample of 128 participants.
Given the hierarchical structure of our data, we used multilevel mediation analyses to test our hypothesis that COVID-worry and optimism would mediate the relationship between COVID-news exposure and general worry and hopelessness. Collected data was in a nested structure where daily observations (level 1) were nested within people (level 2). Mediator and outcome variables were examined using intraclass correlation (ICC) to determine the proportion of variance attributable to within-person and between-person differences across the study period. To control for the possible overlapping contributions of between- and within-person variance in COVID-news exposure to the regression coefficients, COVID-news exposure was person centered such that each observation was subtracted from that participant’s mean exposure score across the study period. Centering on participant means fixes the between-person (level 2) variance to zero for all participants, allowing us to examine how daily increases or decreases in COVID-news consumption relative to an individual’s average frequency of exposure affect the endogenous variables.

Two independent multilevel mediation analyses were conducted with frequency of exposure to COVID news entered as the predictor, COVID-worry and COVID-optimism used as mediator variables, and hopelessness and general worry as outcome variables (see Figures 1 and 2). The predictor, mediator, and outcome variables were each assessed daily across the study period. Therefore, all variables were entered at the same level (observation), creating a 1-1-1 contemporaneous multilevel mediation model with the covariance between COVID-worry and COVID-optimism and the covariance between hopelessness and general worry entered at level 2. All models used random intercepts. Effect sizes for the direct effects of COVID-exposure on the endogenous
variables were calculated using R squared. As recommended by Preacher & Selig (2012), 95% Monte Carlo confidence intervals were used to examine indirect effects. Maximum likelihood estimates of model parameters were calculated using an expectation-maximization (EM) algorithm. All analyses were conducted in R with the lavaan, semTools, and EMAtools packages (Jorgensen et al., 2021; Kleiman, 2017; Rosseel, 2012; RStudio Team, 2015).

Repeated assessment data made examining temporal relationships feasible and a temporal multilevel mediation model was used to examine the next-day effects of COVID-news exposure using the same set of predictor, mediator, and outcome variables. All variables were entered at the same levels as the contemporaneous model with the predictor and mediator variables lagged to predict next-day outcomes (i.e., COVID-exposure, COVID worry, and COVID optimism at time T predicted hopelessness and general worry at time T+1). Temporal analyses were restricted to consecutive-day pairs.

Results

Between April 24th and July 13th, 2020, our final sample of 128 undergraduate students completed 23,028 assessments for a total of 4745 days of data across participants. Among the 128 participants, the average age was 19.98 years (SD=1.61, range=18.44-33.23) and 77.3% (n=99) were female. 48.44% (n=62) of the sample identified as White, 39.06% (n=50) Asian, 7.03% Black/African American, and the remaining 5.47% identified as multiple or other races.

Table 1 shows descriptive statistics and ICCs for all variables. Parameter estimates for the contemporaneous and temporal mediation models are shown in Figure 1 and
Across multiple fit indices, both the contemporaneous model ($X^2(5, N = 128) = 49.325, p < .001, CFI=.969, RMSEA=.044$) and the temporal model ($X^2(5, N = 128) = 48.475, p < .001, CFI=.967, RMSEA=.044$) demonstrated good model fit.

Hypothesis 1 was partially supported by examining the direct effects of changes in the daily frequency COVID-19 media exposure on worry and optimism about the pandemic. In the contemporaneous model (see Figure 1), greater news exposure was significantly associated with greater specific worry about COVID-19 ($b=.145, SE=.010, p < .001$). However, counter to our hypothesis, no relationship was found between frequency of news exposure and optimism about COVID-19 ($b=.011, SE=.011, p=.308$). Similar effects were found in the temporal model (see Figure 2) for both COVID-19 worry ($b=.147, SE=.010, p < .001$) and optimism ($b=.015, SE=.011, p=.191$).

For Hypothesis 2, we first examined the direct relationship between COVID news exposure and general worry and hopelessness. A significant direct effect was found between increased news exposure and increased same-day general worry ($b=.055, SE=.020, p=.007$) but there was no significant direct effect of media exposure on same-day hopelessness ($b=-.029, SE=.016, p=.074$). Similar results were found for the temporal model such that news exposure exhibited a significant direct effect on next-day general worry ($b=.098, SE=.020, p<.001$) but not on next-day hopelessness ($b=0.014, SE=0.017, p=.413$).

COVID-19 worry was significantly associated with same-day general worry ($b=.368, SE=.030, p < .001$) and same-day hopelessness ($b=0.112, SE=0.024, p <.001$). Similar results were found for the relationship between COVID-specific worry and next-day general worry ($b=.252, SE=0.030, p < .001$) and hopelessness ($b=0.064, p < .001$).
SE=0.024, \( p = .008 \). No significant relationship was found between optimism about COVID-19 and same-day or next-day hopelessness and general worry.

We then examined the indirect effects of COVID news exposure on hopelessness and general worry as mediated by COVID-specific worry and COVID-19 optimism. Significant indirect effects were found such that worry about COVID-19 mediated the relationship between COVID news exposure and both same-day general worry (\( b= 0.054, 95\% \text{ CI}= 0.043-0.065 \)) and next-day general worry (\( b= 0.037, 95\% \text{ CI}= 0.028-0.048 \)).

Similar significant indirect effects were found such that COVID-19 worry also mediated the relationship between news exposure and both same-day general worry (\( b= 0.016, 95\% \text{ CI}= 0.009-0.024 \)) and next-day general worry (\( b= 0.009, 95\% \text{ CI}= 0.003-0.0167 \)). Optimism about COVID-19 did not mediate the relationship between news exposure and same-day or next-day outcome variables.

**Discussion**

**Mental health impact of exposure to news about COVID-19**

Our first hypothesis was partially supported in that greater daily exposure to media/news about COVID-19 was associated with same-day elevations in worry about COVID-19. No relationship was found, however, between frequency of media exposure and optimism about the coronavirus outbreak.

Our second hypothesis, that COVID-worry and optimism would generalize to broader worry and hopelessness, thus mediating the relationship between COVID media exposure and outcome variables was also partially supported. Worry about COVID-19 mediated the relationship between increased news exposure and increased same-day and
next-day hopelessness. COVID-worry also mediated the relationship between news exposure and same-day and next-day general worry. However, both the contemporaneous and temporal models yielded significant direct effects between increased news exposure and increased general worry, indicating an effect on broader worried thoughts beyond the variability accounted for by COVID-specific worry. In future research, it may be prudent to examine this direct effect to identify whether there are other potential mediating variables through which media exposure leads to increased worry.

These findings support the generalization of specific worry found in previous literature on the mental health impact of distressing media consumption (Johnston & Davey, 1997). Exposure to COVID-19 news acts on general worry by increasing COVID-19-specific worry, which then generalized to increased diffuse worry in the same day that more COVID-related media than usual is consumed. Similarly, on days when participants engaged with COVID-19 news more frequently than they typically did during the study period, the corresponding increase in general worry persisted throughout the following day. This suggests that the harmful effects of exposure to distressing news about the pandemic maintain over time rather than being limited to momentary reactions. Previous analyses using data from the same participants included in this manuscript indicate that college students report significantly higher levels of average worry specifically about COVID-19 compared to average general worry (Kleiman et al., 2020). Additionally, participants experienced extreme levels of worry about COVID-19 (e.g., momentary scores ≥ 8 out of 10) approximately 7 times as frequently as extreme non-specific worry. Taken together, these findings suggest that although COVID-specific worry generalizes, it does not prompt general worry at the same level and severity of the
specific worry. This may imply that the intensity of worry dampens during generalization, leading to symptoms that are broader but less severe.

**Optimism about COVID-19 and Hopelessness**

Optimism about COVID-19 was not significantly associated with hopelessness or general worry and did not act as a mediator between exposure to COVID-19 news and the outcome variables. Despite evidence that media coverage of the pandemic is overwhelmingly negative in tone and that news broadcasts during data collection (May-July 2020) may have amplified uncertainty about the outcomes of the pandemic, we found no relationship between optimism about COVID-19 and news exposure (Sacerdote et al., 2020; Steinback et al., 2020). This suggests that engaging with more news about COVID-19 in a given day did not make participants more or less optimistic about COVID-19. Further, given that optimism about the pandemic was not significantly associated with hopelessness or general worry, it is unlikely that decreased COVID-optimism would impact same-day or next-day mental health even if the hypothesized relationship with COVID-news was significant. Optimism about COVID-19 has the highest daily average score across our sample compared to other variables examined. This suggests that college students may maintain a general sense of optimism about the pandemic independent from general worry, hopelessness, and media exposure.

Our analyses yielded mixed support for the hypothesized relationship between consumption of news about the pandemic and feelings of hopelessness. There were no direct effects of COVID-news exposure on either same-day or next-day hopelessness. An indirect effect, however, was found through COVID-worry, indicating that COVID-media consumption affects hopelessness by increasing COVID-worry. More research is
needed to determine the nature of the association between media exposure and hopelessness and to identify other possible mediating factors driving the relationship. In sum, although an indirect effect was present, we did not find evidence that COVID-media consumption directly contributes to hopelessness as has been speculated in various media outlets.

Average hopelessness was low in our sample ($M = 1.28$ on a 1 to 5 scale, $SD = 2.16$) which may have limited our ability to find a relationship with daily news exposure. To more accurately capture the range of possible effects of COVID-news exposure on mental health, future research should examine news consumption among a clinical sample with higher levels of average hopelessness.

**Implications**

Our findings indicate that exposure to news about COVID-19 negatively impacts mental health by increasing worry about the pandemic. This highlights the potential risks of increased media consumption during the pandemic. As the pandemic continues and access to traditional coping methods remains limited, turning to news and media as a method to reduce uncertainty and distressing emotions may instead intensify distress and lead to deleterious mental health outcomes. Daily engagement with news about COVID-19 may represent a modifiable clinical target. Although information seeking behavior during a crisis may be conceptualized as a helpful, preventative behavior, these findings in tandem with recent research on media consumption, anxiety, and distress suggest that regular exposure to COVID-related media is harmful rather than helpful. Previous research has indicated that only specific types of media engagement (i.e., news from official, government or health organization sources) are related to preventive behaviors.
but that COVID-news consumption increases anxiety and distress regardless of platform or media source (Amundsen et al., 2020; Bendau et al., 2020; Liu et al., 2020). Developing alternative coping strategies that do not involve news or potential exposure to COVID-19 information via various media sources may be beneficial during the pandemic. Given that no relationship was found between optimism about COVID-19, worry, and hopelessness, it is possible that even if certain types of media or information increase optimism about the pandemic, greater optimism may not protect against negative mental health outcomes.

The same-day and next-day generalization of COVID-specific worry associated with increased exposure to COVID-related news highlights potential opportunities for brief, targeted interventions. Szabo and Hopkinson (2007) found that individuals who engaged in a brief (i.e., 15 minute), progressive relaxation exercise after watching distressing TV news experienced a more rapid return to affective baseline compared to participants who engaged in a distraction exercise. For participants in both conditions, watching 15 minutes of distressing news decreased subsequent positive affect and increased state anxiety and overall mood disturbance. These effects persisted only for participants who did not engage in the targeted relaxation intervention, indicating that brief interventions may help to reduce the duration of negative mental health outcomes associated with upsetting news exposure. This may be particularly relevant with regard to our finding that media consumption affects mental health through the generalization of worry about the topic specifically depicted in the newscast. Short interventions like progressive relaxation can have rapid beneficial effects and may interrupt the mediation
process through which specific worry then generalizes to broader worry and hopelessness.

Limitations and Strengths

There were several limitations of the current study that should be acknowledged. We assessed daily news exposure using a single self-report item in the nightly surveys. The item (“How frequently did you see or read news or media about the coronavirus outbreak today?”) was intentionally broad to capture a wide range of media interactions but limited the examination of specific types of media exposure and consumption. Our sample consisted of undergraduate students at a single university. Although participants were racially and ethnically diverse, findings may not generalize to all students or to broader adult samples.

This study had several strengths. It is the largest and most fine-grained study to date on the relationship between frequency of daily news exposure and same-day and next-day mental health outcomes among college students. Using consecutive days of data, this study represents an important examination of how worry and optimism about COVID-19 generalize to subsequent hopelessness and general worry. The present research includes data collected during the first months of the pandemic and includes a large sample size with over 23,000 assessments across 128 participants.

Future directions

Additional research using more comprehensive assessments of media exposure and engagement is needed to examine the differential effects of indirect, unintentional exposure to news about COVID-19 (e.g., seeing distressing headlines posted on social media) compared to the effects of information seeking behavior and intentional
engagement with COVID-related news. Collecting more granular data (i.e., momentary assessments) of media exposure may illuminate more proximal mental health impacts of news about COVID-19 (i.e., over periods of hours rather than across the whole day). Future research should also be conducted on the mental health impact of exposure to COVID-19 news among clinical samples who are at elevated risk of hopelessness and other negative outcomes.
References


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Table 1. Mean, SD, and ICC for all variables across the study period.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>SD</th>
<th>ICC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Exposure to COVID-19</td>
<td>1.16</td>
<td>1.38</td>
<td>0.55 (95% CI = 0.48-0.61)</td>
</tr>
<tr>
<td>media/news</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Worry about COVID-19</td>
<td>2.12</td>
<td>1.6</td>
<td>0.83 (95% CI = 0.79-0.86)</td>
</tr>
<tr>
<td>3. Optimism about COVID-19</td>
<td>2.78</td>
<td>1.23</td>
<td>0.70 (95% CI = 0.65-0.76)</td>
</tr>
<tr>
<td>4. General worry</td>
<td>1.61</td>
<td>2.21</td>
<td>0.66 (95% CI = 0.60-0.71)</td>
</tr>
<tr>
<td>5. Hopelessness</td>
<td>1.28</td>
<td>2.16</td>
<td>0.77 (95% CI = 0.73-0.8)</td>
</tr>
</tbody>
</table>

Figure 1. Contemporaneous multilevel mediation model.
Figure 2. Temporal multilevel mediation model with next-day effects.
COVID-19 Media Exposure

Worry about COVID

Optimism about COVID

Next-day hopelessness

Next-day general worry

*p < .05, **p < .01, ***p < .001