Eating disorders and trajectory of mental health across the COVID-19 pandemic: Results from the Understanding America study

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ABSTRACT

Background: Given the unprecedented nature of the COVID-19 pandemic, it is important to understand how those with eating disorders (EDs) are affected by the pandemic. Using data from the Understanding America Study (UAS), we examined the association between EDs and mental health and how the relationship changed over time across the months following the institution of virus containment procedures (e.g., social distancing, quarantine).
Method: The analytic sample consisted of 7137 adults (Mage =50.58 years; SD =16.10) who completed surveys between waves 1–11 of the UAS study. Participants self-reported ED diagnosis (i.e., yes, no, or unsure) and completed self-report measures of psychological distress, perceived stress, and loneliness. Multilevel models were used to compare trajectories of psychological distress, perceived stress, and loneliness among ED groups.
Results: Individuals with EDs and unsure EDs had higher levels of psychological distress, perceived stress, and loneliness compared to those without EDs. Those unsure about their EDs showed initial decreases in perceived stress and loneliness but started increasing again after some time. Levels of loneliness among those with EDs increased initially but later began to decrease; individuals with EDs showed steady decreases in perceived stress.
Limitations: Type, severity, and duration of EDs were unspecified in the self-reported measure of EDs, which could differentiate the trajectories of outcomes.
Conclusions: Intervention is crucial for mitigating mental health problems among those with a history of ED symptoms during COVID-19. Further, results showed that individuals who are unsure about their ED status may be experiencing more fluctuation in mental health across the pandemic.

1. Introduction

The coronavirus (COVID-19) pandemic has dramatically altered people's lives by disrupting and changing daily activities, lifestyle, and financial security. As the pandemic proliferated into staggering numbers of infected cases and deaths, it has been mandated for people to engage in social distancing and quarantining to stop the spread of the virus. The adjustment to new norms, such as social distancing, quarantining, and activity restrictions, has required tremendous efforts and, axiomatically, this considerable change in lifestyle has had a great toll on people's mental health (Wang et al., 2020). While the COVID-19 pandemic has affected the whole population, the disruption and new requirements that have been mandated to reduce the further spread of the pandemic have particularly put those with eating disorders (EDs) at higher risk of worsening conditions (Cooper et al., 2020).

Those with EDs often experience psychological issues such as

anxiety, depression, feelings of lack of control, excessive worrying, stress and loneliness (Levine, 2012; Lindeman and Stark, 2001; Rosen et al. 1993; Swinbourne et al., 2012). These issues are likely to worsen since the widespread pandemic has necessitated, or at least encouraged, people to change their personal and social practices to abide by mandated regulations, which consequently could lead to a lack of social interaction and potential isolation. Specifically, they are prone to undergoing more psychological issues due to limited food choices, fear of food shortage, unavailability of certain food products they prefer and consequent obsessions with food (Waters et al., 2001), restricted work and studying activities to home (Rodgers et al., 2020), less space for movement (exercise), lack of physical activity and weight concerns (Haines et al., 2010; Rodgers et al., 2020), the absence of clear routines that support eating plans and structures (Rodgers et al., 2020), and limited access to professional help (Cook-Cottone, 2016) in addition to general anxiety for the future.

The prolonged pandemic is a particular concern for those with EDs in that they may be more vulnerable, given increased lack of social interaction and reduced accessibility to professional help during the pandemic. In addition to the exacerbation of ED symptoms (Phillipou et al., 2020; Rodgers et al., 2020), their psychological health may be disproportionately challenged. Recent studies discussed and examined the relationship between EDs and mental health during the COVID-19 pandemic. Those with EDs reported increased loneliness, sadness, and restlessness following lockdown during the pandemic (Schlegl et al., 2020) and additional anxiety symptoms during lockdown (Fernandez-Aranda et al., 2020). It is not certain, however, how mental health has changed over time among those with EDs as the pandemic has progressed and how the changes differ from those without EDs.

The Understanding America Study (UAS) provides a unique opportunity to examine how the mental health of those with EDs has changed as the pandemic has progressed and how the change differs from those without EDs. UAS surveys a nationally representative sample of American adults ages 18 and over, which is a key strength compared to previous studies that were based on small, localized or clinic-setting samples. It is important to examine the trajectories of change of those with and without EDs in order to better understand the disproportionate vulnerability of those with EDs. Specifically, we studied mental health trajectories across the COVID-19 pandemic among those with EDs and those who were unsure if they had an ED compared to those without EDs. Being unsure about whether one has an ED but potentially observing one's own ED symptoms could indicate a lack of professional support and an instability in where the individual stands within their disorder. It was hypothesized that the ED and unsure ED group would have poorer mental health compared to those without EDs, but changes across the pandemic was exploratory.

2. Methods

2.1. Data and participants

Data from the Understanding America Study (UAS) COVID-19 Survey were used for the current report. The UAS is a probability-based internet panel data of about 9000 adults, representative of the non-institutionalized adult population of ages 18+ in the United States (Alattar et al., 2018). Participants were recruited randomly through address-based sampling (Kapteyn et al., 2020). Since surveys were conducted online, internet access was required, which was provided if needed. About 7000 out of the 9000 UAS panel members agreed to participate in the UAS COVID-19 Tracking Survey (Kapteyn et al., 2020), of which 6931 (wave 1), 5478 (wave 2), 6287 (wave 3), 6403 (wave 4), 6407 (wave 5), 6408 (wave 6), 6346 (wave 7), 6077 (wave 8), 6289 (wave 9), 6371 (wave 10), and 6238 (wave 11) participated in the survey.

Since the first wave collected between March 10 and March 31, 2020, surveys were repeated every two weeks. We used the first eleven waves of the UAS data. We used the wave 4 ED status when the ED question was first added to the survey, and supplemented ED status from the subsequent waves if ED status at wave 4 was missing. Starting from wave 2, all participants were invited to take a survey over a 14 day span and asked to respond within two weeks. Thus, wave 2 was collected between April 1 and April 28, wave 3 between April 15 and May 12, wave 4 between April 29 and May 26, wave 5 between May 13 and June 9, wave 6 between May 27 and June 23, wave 7 between June 10 and July 7, wave 8 between June 24 and July 21, wave 9 between July 8 and August 4, wave 10 between July 22 and August 19, and wave 11 between August 5 and September 2.

2.2. Measures

2.2.1. ED diagnosis

Participants were asked: "Has a doctor or another health professional ever told you that you have an eating disorder?" Response options included yes, no, and unsure.

2.2.2. Psychological distress

Psychological distress was measured by the Patient Health Questionnaire-4 (PHQ-4; Kroenke et al., 2009), which evaluates symptoms of depression and anxiety. PHQ-4 has four questions: "Over the past fourteen days, how often have you been bothered by any of the following problems? (1) Feeling nervous, anxious, or on edge; (2) not being able to stop or control worrying; (3) feeling down, depressed, or hopeless; and (4) little interest or pleasure in doing things. Respondents chose from 0 (*not at all*), 1 (*several days*), 3 (*more than half the days*), and 4 (*nearly every day*). The final sum score ranged from 0 to 12, with a higher score indicating greater psychological distress.

2.2.3. Perceived stress

Perceived stress was measured by four items from the Perceived Stress Scale (PSS-4; Warttig et al., 2013): "In the past fourteen days, how often have you felt (1) that you were unable to control the important things in your life; (2) confident about your ability to handle personal problems; (3) that things were going your way?; and (4) difficulties were piling up so high that you could not overcome them?" Response options were 0 (*never*), 1 (*almost never*), 2 (*sometimes*), 3 (*fairly often*), and 4 (*very often*). The second and the third questions were reversed scored and a total score was calculated ranging from 0 to 16, with a higher score indicating higher levels of perceived stress.

2.2.4. Loneliness

Loneliness was measured by a single question: "In the past 7 days, how often have you felt lonely?" Response options were 1 (*not at all or less than 1 day*), 2 (*1–2 days*), 3 (*3–4 days*), and 4 (*5–7 days*). The score ranged 1 to 4, with 4 indicating the highest level of loneliness.

2.2.5. Covariates

Covariates included self-reported age, gender (*male or female*), education (1 (*less than 1st grade*), 2 (*1st, 2nd, 3rd or 4th grade*), 3 (*5th or 6th grade*), 4 (*7th or 8th grade*), 5 (*9th grade*), 6 (*10th grade*), 7 (*11th grade*), 8 (*12th grade – no diploma*), 9 (*high school graduate – high school diploma or the equivalent*), 10 (*some college but no degree*), 11 (*associate degree in college – occupational/vocational program*), 12 (*associate degree in college – academic program*), 13 (*bachelor's degree*), 14 (*master's degree*), 15 (*professional school degree*), and 16 (*doctorate degree*), and race/ethnicity (i. e., non-Hispanic White, non-Hispanic Black, Hispanic, non-Hispanic Asian, non-Hispanic Native American, and Other/Mixed)).

2.3. Statistical analysis

Descriptive statistics were calculated. Multilevel models via SPSS v. 25.0 were used to examine main effects of ED diagnosis and the linear and quadratic time terms and the two-way interactions between ED diagnosis and the linear and quadratic time terms. Models were examined separately for each dependent variable resulting in three models. Covariates were included in all models. All participants with at least one data point were included in models.

3. Results

The sample had 7764 participants who completed at least one of the eleven waves. There were 447 participants missing the ED variable and thus removed. This left a sample of 7317. Among them, 4162 (56.9%) participated in all 11 waves and 6466 (88.4%) participants completed at least 6 waves. The mean age was 50.58 years (*SD*=16.10; Range: 18–110). About 58.80% reported their gender as female. The sample was 64.7% non-Hispanic White (*n* = 4732), 7.9% non-Hispanic Black (*n* = 579), 16.8% Hispanic (*n* = 1227), 5.1% non-Hispanic Asian (*n* = 376), 0.9% Native American (*n* = 63), 4.5% Other (*n* = 328), and 0.2% were

missing ($n = 12$). About 5.4% had less than high school education, 16.7% had high school or less, 22.8% had some college, 14.3% had associate degree, 24.3% had bachelor's degree, and 16.5% had an advanced college degree. In terms of ED status, 2.10% reported a diagnosed ED ($n = 157$), 1.70% were unsure about their ED status ($n = 122$), and 96.20% had no ED ($n = 7038$). Those with EDs had a greater prevalence of self-reported lifetime psychiatric comorbidities compared to those without EDs. For example, 56% of those with EDs reported having been diagnosed with an anxiety disorder compared to 16% of those without EDs. Similarly, 17% of those with EDs and 3% of those without EDs reported lifetime diagnosis of bipolar disorder, and 65% of those with EDs and 19% of those without EDs reported lifetime diagnosis of depression. When looking at lifetime prevalence of at least one disorder (depression, anxiety, or bipolar), 73% of those with EDs reported diagnosis of at least one disorder compared to 24% of those without EDs.

3.1. Psychological distress

Table 1 displays the effect of ED group on trajectory of psychological distress, and Fig. 1 depicts the trajectories of psychological distress over time by ED group. Older age, Black race, and higher education were associated with lower psychological distress, and female gender and Asian race were associated with higher psychological distress. There were main effects of ED status such that individuals with EDs and unsure EDs had higher levels of psychological distress ($ps<0.001$). There were significant linear and quadratic interactions between the unsure ED group and time ($p=.001$ for linear and $p=.01$ for quadratic interactions) and between the ED group and time ($p=.01$ for linear and $p=.005$ for quadratic interactions). For those with EDs, the trajectory of psychological distress was stable in early waves but began decreasing around Wave 7 (June 10 to July 7). Trajectories of psychological distress for the unsure ED group initially decreased but stabilized around wave 9 (between July 8 and August 4).

3.2. Perceived stress

Table 1 displays the effect of ED group on trajectory of perceived stress, and Fig. 2 depicts the trajectories of perceived stress over time by ED group. Older age and higher education were associated with lower perceived stress, and female gender and Asian race were associated with higher perceived stress. There were main effects of ED status such that

individuals with EDs and unsure EDs had higher levels of perceived stress ($ps<0.001$). There were significant linear and quadratic interactions between the ED group and time ($p=.017$ for linear and $p=.033$ for quadratic interactions); there was no linear interaction, but a quadratic interaction with time for the unsure ED group. The trajectory of perceived stress for the ED group decreased steadily over time, and the trajectory of perceived stress for the unsure ED group initially decreased but began increasing again around wave 8 (between June 24 and July 21).

3.3. Loneliness

Table 1 displays the effect of ED group on trajectory of loneliness, and Fig. 3 depicts the trajectories of loneliness over time by ED group. Older age and Black race were associated with lower loneliness, and female gender was associated with higher loneliness. There was a main effect of having an unsure ED status such that individuals with unsure EDs had higher levels of loneliness ($ps<0.001$). There were significant linear and quadratic interactions between the unsure ED group and time ($p=.003$ for linear and $p=.004$ for quadratic interactions), and there was a trending linear interaction ($p=.054$) and significant quadratic interaction between the ED group and time ($p=.026$). The trajectory of loneliness for the unsure ED group initially decreased but began increasing again around wave 8 (between June 24 and July 21). The trajectory of loneliness for the ED group initially increased but stabilized starting from waves 4 and 5, and decreased more again around wave 9 (between July 8 and August 4).

4. Discussion

This analysis showed that compared to those without EDs, those with EDs and unsure EDs reported higher levels of mental health problems throughout the pandemic. Those with EDs tended to have higher levels of mental health problems compared to individuals reporting to being unsure about EDs, particularly in regard to psychological distress. These results are consistent with other research finding higher levels of mental health problems among those with EDs (Hudson et al., 2007). Also, findings add that those with EDs typically had elevated mental health problems throughout the COVID-19 pandemic, with some changes and fluctuations seen across time. Further, analyses showed that negative mental health symptoms initially increased among those with EDs, yet as

Table 1
Multilevel models of effect of eating disorders (EDs) on mental health over time.

	Psychological Distress				Perceived Stress				Loneliness			
	B	SE	p	95% CI	B	SE	p	95% CI	B	SE	p	95% CI
Intercept	3.80	0.18	<0.001	3.44, 4.16	8.84	0.20	<0.001	8.44, 9.23	1.97	0.65	<0.001	1.85, 2.10
Age	−0.03	0.00	<0.001	−0.03, −0.03	−0.04	0.00	<0.001	−0.04, −0.04	−0.01	0.00	<0.001	−0.01, −0.01
Gender†	0.61	0.06	<0.001	0.50, 0.72	0.56	0.06	<0.001	0.44, 0.68	0.14	0.02	<0.001	0.10, 0.18
Race‡												
Non-Hispanic Black	−0.59	0.11	<0.001	−0.79, 0.38	−0.15	0.11	.200	−0.37, 0.08	−0.10	0.03	.004	−0.17, −0.03
Hispanic	0.04	0.08	.643	−0.20, 0.12	0.16	0.09	.067	−0.01, 0.33	0.04	0.03	.118	−0.09, 0.01
Non-Hispanic Asian	0.29	0.13	.022	0.04, 0.05	1.07	0.14	<0.001	0.80, 1.35	0.07	0.04	.079	−0.01, 0.16
Non-Hispanic Native American	−0.53	0.30	.076	−1.11, 1.05	0.26	0.32	.417	−0.37, 0.90	−0.11	0.10	.267	−0.30, 0.08
Non-Hispanic Other	0.02	0.13	.879	−0.24, 0.28	0.14	0.15	.323	−0.14, 0.43	0.01	0.04	.757	−0.07, 0.10
Missing	−0.60	0.69	.385	−1.97, 0.76	0.21	0.84	.800	−1.85, 1.43	−0.29	0.25	.255	−0.79, 0.21
Education	−0.03	0.01	.015	−0.05, −0.01	−0.13	0.01	<0.001	−0.15, −0.10	−0.01	0.00	.125	−0.01, 0.00
ED status§												
Yes	2.18	0.24	<0.001	1.70, 2.66	1.17	0.36	.001	0.47, 1.86	0.27	0.19	.153	0.10, 0.63
Unsure	2.01	0.29	<0.001	1.45, 2.57	2.08	0.42	<0.001	1.25, 2.91	0.90	0.22	<0.001	0.46, 1.34
Wave	−0.07	0.01	<0.001	−0.09, −0.06	−0.13	0.01	<0.001	−0.26, −0.21	−0.02	0.01	.002	−0.04, −0.01
Wave-squared	0.00	0.00	.021	0.00, 0.00	0.01	0.00	<0.001	0.01, 0.01	0.00	0.00	.034	0.00, 0.00
ED status§ x Wave												
Yes x Wave	0.15	0.06	.010	0.04, 0.27	0.24	0.10	.017	0.14, 0.43	0.10	0.05	.054	−0.00, 0.19
Unsure x wave	−0.24	0.07	.001	−0.38, −0.10	−0.22	0.12	.060	−0.45, 0.01	−0.18	0.06	.003	−0.30, −0.06
ED status§ x Wave-squared												
Yes x Wave-squared	−0.14	0.00	.005	−0.02, −0.00	−0.02	0.01	.033	−0.03, −0.00	−0.01	0.00	.026	−0.01, −0.00
Unsure x Wave-squared	0.01	0.01	.010	0.00, 0.03	0.02	0.01	.009	0.01, 0.04	0.01	0.00	.004	0.00, 0.02

Note: ED= eating disorder; †Reference group is male; ‡Reference group is non-Hispanic White; §Reference group is no ED.
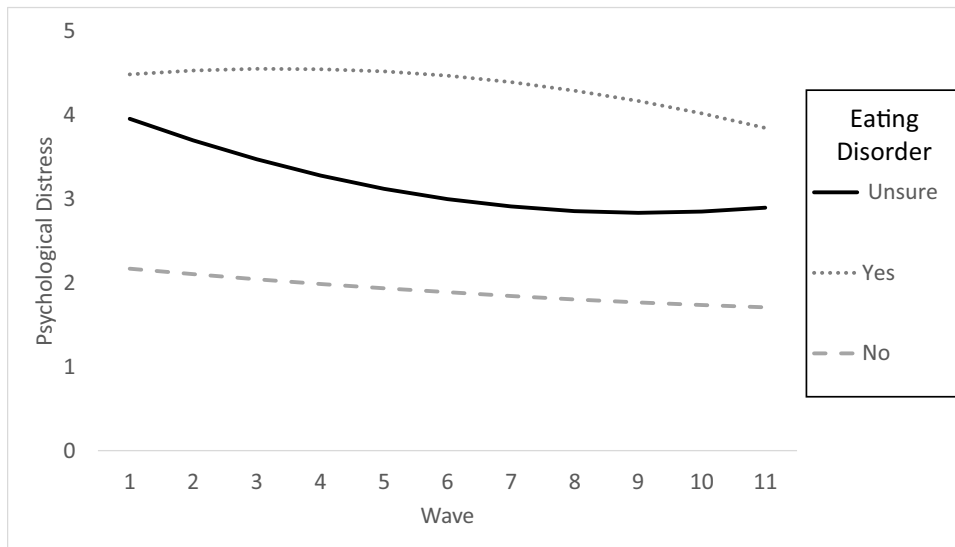
Fig. 1. Trajectories of psychological distress by eating disorder status across waves.
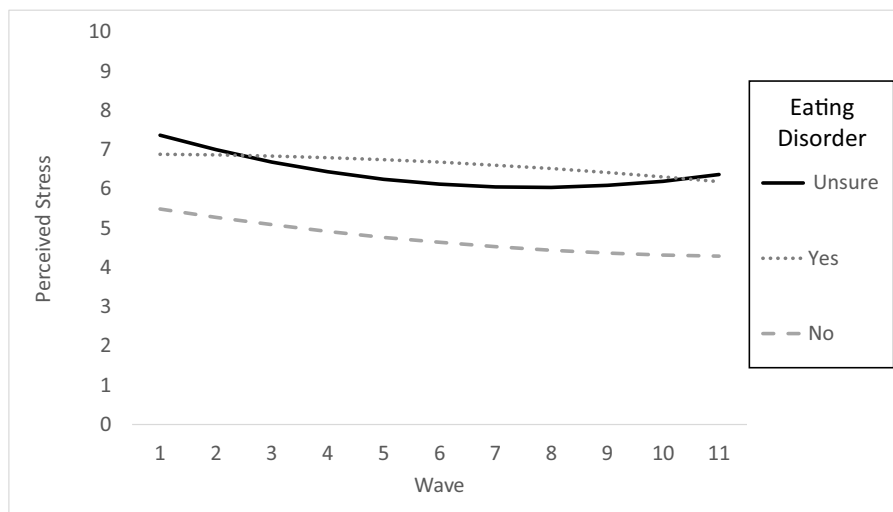

Fig. 2. Trajectories of perceived stress by eating disorder status across waves.
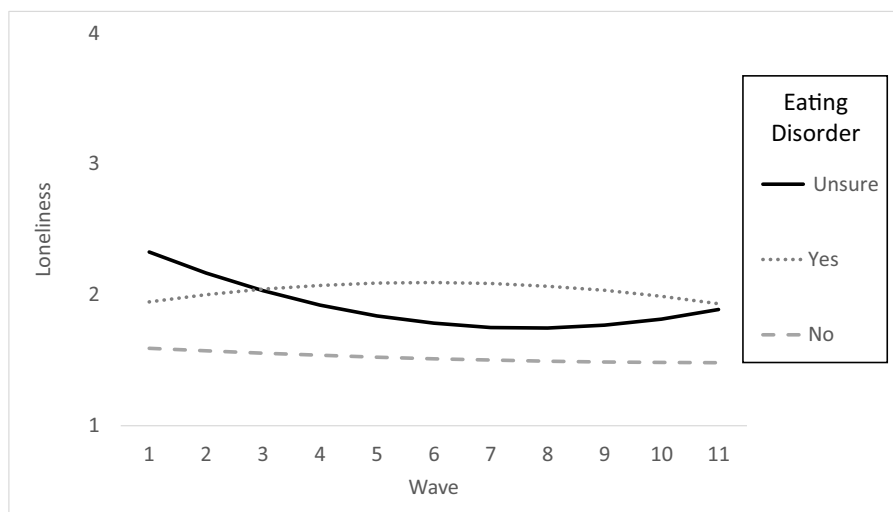

Fig. 3. Trajectories of loneliness by eating disorder status across wave.

the pandemic continued, negative mental health symptoms eventually decreased somewhat. This suggests that those with EDs began to feel less distressed, stressed, and lonely, possibly due to increasingly being allowed to return to normal life routines. In addition, unsure EDs showed nonlinear relationships between time and mental health such that they had greater negative mental health symptoms that improved over time, but their negative mental health symptoms appeared to increase as the pandemic prolonged. This may perhaps be due to not receiving treatment or change in symptoms.

While the unsure ED group generally had better mental health than the ED group, they were less stable over time. Given the volatility of mental health across the pandemic, it is possible that those with symptoms of an ED but not having been formally diagnosed may experience worsening of ED symptoms during this prolonged pandemic and may reach full-syndrome ED symptom level, if they were not already. Further, the absence of a diagnosis could prevent family members, friends, or medical professionals from providing adequate treatment or support.

While those with EDs had somewhat stable mental status over time, it is critical to keep in mind that they had the greatest mental health problems. Given that access to professional health care is limited during the pandemic, it is important that health care professionals keep track of their patients and monitor their physical and mental health symptoms. Constant monitoring and communicating via virtual/teleconference devices may be useful for patients who otherwise do not have access to open communication and clinical/holistic guidance.

While this study provides critical information about the association between EDs and trajectories of mental health in a large sample of United States adults during the COVID-19 pandemic, there are some limitations in our study that we need to note. First, we were bound to the measures used in the Understanding America Study, which assessed a variety of mental and physical health constructs. Thus, measures were brief and based on self-report. As a result, ED status was self-reported with a single item, and specific diagnoses were not elucidated. Trajectories of mental health may have differed between EDs and depending upon severity of ED behaviors and cognitions, which we could not examine. Also, while results showed that unsure ED is an important category to understand, it is somewhat unclear what this category represents. Next, the severity and duration of EDs are unknown, which might have had an impact on the trajectory of their mental health over time.

Moreover, lifetime EDs were measured, and we do not have information on the current status of participants' EDs. Thus, we were not able to examine trajectories of mental health by lifetime versus current ED status. It is possible that the pandemic is associated with recurrence of remitted EDs or that individuals with current EDs were more affected by the pandemic, but we cannot examine these research questions from our data. Further, while the majority of participants with EDs evidenced lifetime diagnosis of at least one mood or anxiety disorder, we do not have data on current diagnosis of mood and anxiety disorders and thus cannot study differences by current mood or anxiety disorder. Finally, we do not have information on body mass index, and thus we could not control for the association between weight and mental health.

Based on the nationally representative sample of adults residing in the United States, this study showed the worse mental health among EDs and unsure EDs and a particularly unstable trajectory in mental health among unsure EDs over time. The bi-weekly survey data used were particularly useful since they captured the rapidly changing mental health status in this unique time, particularly among those with mental health issues. Our study suggests that it is important to monitor and care for those with EDs as well as those who have potential EDs; this includes helping them cope with rapidly changing guidelines and demands during this unprecedented time.

CRediT authorship contribution statement

Sharon Kim: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Writing - original draft. **Wei-Lin Wang:** Formal analysis, Writing - review & editing. **Tyler Mason:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Supervision, Writing - review & editing.

Declaration of Competing Interest

There is no conflict of interest to disclose.

Data availability statement

The data is available through the Center for Economic and Social Research (CESR). The authors can help facilitate data requests.

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