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## The Effects of COVID-19 Induced Stress, Anxiety and Depression on the Eating Behavior of College Women

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Thesis title The Effects of COVID-19 Induced Stress, Anxiety and  
Depression on the Eating Behavior of College Women

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**The Effects of COVID-19 Induced Stress, Anxiety and Depression on the Eating  
Behavior of College Women**

A Thesis

Presented to the Department of Psychology

College of Liberal Arts and Sciences

and

The Honors Program

of

Butler University

In Partial Fulfillment

of the Requirements for Graduation Honors

Natalie Simpson

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## Abstract

Increases in the prevalence of disordered eating patterns have been linked to distress and poor mental well-being. Additionally, COVID-19 has been linked to both depressive and anxious symptomatology, along with increased feelings of distress (Fitzpatrick et al., 2020). Because disordered eating is particularly prevalent among college-aged women, this study sought to determine how depression, anxiety, and stress affect eating behaviors of college women in the context of the COVID-19 pandemic. 179 women at Butler University, aged 18-24, gave informed consent before completing a questionnaire pertaining to their demographics, their stress surrounding COVID, and their weight change since March 2020. The next set of questionnaires asked about their anxiety, stress, and depression, as well as their eating behaviors, first at the time they completed the survey (September-December 2021) and next during the COVID-19 lockdown period (March-August 2020). Depression, anxiety, and stress were significantly higher during COVID-19 than during the fall of 2021, but college-aged women reported more restraint in their eating at the time of the study. No overall differences emerged in uncontrolled or emotional eating across the two time points. In correlational analyses, depression and anxiety during COVID-19 correlated with both uncontrolled and emotional eating (depression also correlated with cognitive restraint). Although change in self-reported stress levels across time did not predict changes in disordered eating, improvements in depression and anxiety from Spring 2020 to Fall 2021 correlated with less emotional eating across time. Together, these findings reinforce past research showing that college-aged women are a particularly vulnerable population during times of crisis.

## **The Effects of COVID-19 Induced Stress, Anxiety and Depression on the Eating Behavior of College Women**

Disordered eating behavior associated with stress is a topic that has been given significant attention in the current literature. Disordered eating (DE) patterns are not the same as eating disorders, which are more extreme diagnosable psychological disorders (Lee & Vaillancourt, 2019, p. 821). Disordered eating is influenced by many factors. A study that looked at risk factors for disordered eating among female youth concluded DE risk was associated with internalizing symptoms of anxiety, depression, and social stressors (Russon et al., 2019). Similarly, another longitudinal study of 10-year-old children found a positive correlation between anxiety disorders in adolescence and a range of DE symptoms at age 16 (Schaumberg et al., 2019). Additionally, both anxiety and depressive disorders during early adolescence correlated with eating problems in early adulthood (Johnson et al., 2002). Finally, a study in which 466 individuals aged 18 to 65 kept daily diaries of their eating styles and daily hassles (i.e., sources of stress and annoyance that can occur day-to-day) showed that daily hassles also led to an increase in unhealthy eating behavior (O'Connor et al., 2008).

Disordered eating is particularly prevalent among college-aged women. In a study that included 643 undergraduate women, 82% reported one or more dieting behaviors at least daily, and 33% reported more serious forms of weight control (i.e., use of laxatives or vomiting) at least once a month. 38% reported problems with bingeing (Mintz & Betz, 1988). More recently 445 undergraduate students at a large university completed the Eating Attitudes Test and the Dutch Eating Behavior Questionnaire. This study revealed that college-aged women exhibited restrained eating and emotional eating but also that

women were significantly more likely to be at risk for eating disorders than their male counterparts (Perryman et al., 2018). These studies show the importance and relevance of understanding the link between disordered eating patterns and stressors that negatively influence the mental health of college-aged women.

A recent factor that has increased stress for all college students is the COVID-19 pandemic. COVID-19 has had a monumental effect on the world and especially the mental health of individuals. Fear of COVID-19 has been linked to both depressive and anxious symptomatology, along with increased feelings of distress (Fitzpatrick et al., 2020). Together, the associated climate of illness risk, job loss, financial insecurity, death of loved ones, racial and economic inequities, and an overwhelmed health care system has resulted in significant increases in stress for many U.S citizens (Marmarosh et al., 2020).

The increased stress associated with COVID-19 has resulted in more prevalent COVID-19 depression and depressive symptoms among adults aged 18 and over (Fitzpatrick et al., 2020). Specifically, the experience of disconnection and isolation during and after quarantine has been shown to lead to depression, anxiety, and stress (Marmarosh et al., 2020). An online survey evaluated changes in mental well-being and depressive symptoms before versus during the period of home confinement and found that individuals reported decreased mental well-being during confinement, as well as significant increases in depressive symptoms (Ammar et al., 2020).

Beyond depression, feelings of distress and anxiety also significantly increased during the COVID-19 pandemic. A study from an internet panel of US adults showed that each additional day of the pandemic resulted in an 11% increase in the odds of

having more distress (Holingue et al., 2020). Anxiety also increased. Another study reported that the percentage of respondents who indicated that their anxiety was either high or extreme quadrupled from 5% to 20% following the onset of COVID-19 (Dozois, 2020). It is particularly important to look at COVID19-related distress in young adults. A study examining psychological distress after lockdown using the Kessler 6 Psychological Distress Scale found that 13.6% of adults reported serious distress compared to 3.9% in 2018. Symptoms of distress were highest in young adults aged 18-29 years old (McGinty et al., 2020). This points to the importance of understanding responses to COVID-19 in this age group in particular.

Building on this past literature, the current study sought to determine how depression, anxiety and stress affected eating behaviors of college women in the context of the COVID-19 pandemic. Because the Corona virus increased mental health issues in college students, (Ammar et. al 2020; Dozois 2020; Fitzpatrick et. al 2020; Holingue et. al. 2020; McGinty 2020) and because increased depression, anxiety, and stress is associated with disordered eating behavior, (Johnson et. al 2002; Lee et. al 2019; Meyer and Lepta 2019; Perryman et al., 2018) particularly among college-aged women, I hypothesized that the stress, depression, and anxiety triggered by COVID-19 would correlate with disordered eating among women. Additionally, I hypothesized that improvements in emotional state post COVID-19 would relate to improvements in eating behavior in women after the pandemic.

## Method

### Participants

Participants included 179 undergraduate women at Butler University aged 18-24 ( $M= 19.90$ ,  $SD= 1.24$ ) from a variety of backgrounds. Of the sample of women, 97.8% identified as female, 1.7% identified as non-binary and 0.6% preferred not to say. The sample included students in all years of college, from their first year to their fourth year ( $M= 2.63$ ,  $SD= 1.13$ ). Additionally, participants came from a variety of racial backgrounds (*Black or African American* (6.1%), *White* (87.7%), *Asian* (8.9%), *American Indian or Alaska Native* (0.6%), and *Hispanic ethnicity* (0.6%)). All participants provided informed consent prior to completion of the survey. Because all participants were women or non-binary, the analyses do not include gender as a factor.

### Materials

Each participant completed a 30 question Qualtrics online survey between September and December 2021. It consisted of a series of questionnaires related to eating behavior, depression, anxiety, and stress both in the past (March-August 2020) and at the time they completed the survey. I largely adapted existing questionnaires to read in both past and present tense and to fit the online format of the Qualtrics system.

*Demographic Questionnaire.* A demographic questionnaire created for the purposes of this study asked participants their age, race, ethnicity, and year in school. Participants also indicated their level of concern about COVID-19 on a single item by responding on a Likert type scale that ranged from 1-*Not concerned* to 3-*Very concerned* as well as whether they lost weight, gained weight or their weight remained stable across the past year.



*The Three-Factor Eating Questionnaire - Revised 18 item* (Karllson, 2000). This questionnaire is an 18-item scale comprising items assessing cognitive restraint, uncontrolled eating, and emotional eating. Some examples of questions include: “Sometimes when I’m eating, I can’t stop” (uncontrolled eating), “I do not eat some foods because they make me fat” (cognitive restraint), and “When I feel blue, I overeat” (emotional eating). Participants rated each item on a scale ranging from 4-*True* to 1-*Definitely false* or 4-*Almost always* to 1-*Only at mealtimes*.

*Center for Epidemiological Studies-Depression Questionnaire* (Radloff, 1977). The CES-D is a 20-item questionnaire that asked participants to rate how often over the past week they experienced depressive symptoms. Examples included: feelings of loneliness, restless sleep, and loss of appetite. Response options ranged from 0-*Rarely or none of the time*, to 3-*Almost all the time*. Scores ranged from 0-60 with higher scores indicating greater depressive symptoms.

*State-Trait Anxiety Inventory for Adults* (Spielberger, 1983). This 20-item scale describes features of trait anxiety (e.g., “I feel nervous”), and participants rated how much each statement described how they generally felt. All items were answered on a scale from 1-*Almost never* to 4-*Almost always*. Higher scores indicated greater trait anxiety.

*Perceived Stress Scale* (Cohen et al., 1983). This instrument included 10 items that focus on stress and coping over the preceding month (e.g., “How often have you felt that you couldn’t control the important things in your life?”). Responses were made on a 5-point Likert scale (0-*Never*, to 5-*Very often*), and the items were then summed to give a total perceived stress score with a range of 0-*Least stressed*, to 40-*Most stressed*.

## Procedure

This study was conducted through an online survey using Qualtrics, with participants primarily recruited through Sona, an online participant management system. Additional participants were invited to be part of the study through the Honors listserv, Alpha Phi listserv and personal connections. After giving informed consent, participants first completed a questionnaire pertaining to their basic demographic characteristics, their stress surrounding COVID and their weight change. The next set of questionnaires asked about eating behaviors, depression, anxiety, and stress at the time they completed the survey (September-December 2021). Finally, they answered the same set of four questionnaires rating their anxiety, stress and depression, and their eating behaviors during the lockdown period of the COVID-19 pandemic (March-August 2020). The survey took about 15-20 minutes, and participants were thanked for their time once they completed it. Some received extra credit in a Psychology class in return for their participation.

## Results

### *Change in Emotional States*

Before addressing the primary hypotheses of the study, I examined changes in the self-reported emotional states of participants between the time of the COVID-19 pandemic lockdown and the time of the study. See Figure 1. Significant differences emerged between past self-reported emotional states and current self-reported emotional states. Self-reported depression ( $F(1,178) = 117.01, p < 0.001, \eta_p^2 = 0.397$ ) and self-reported anxiety ( $F(1,178) = 91.997, p < 0.001, \eta_p^2 = 0.341$ ) were significantly higher in the past than at the time of the study. The change in self-reported stress between time

periods was more subtle, but still reached statistical significance,  $F(1,178) = 10.521, p = 0.001, \eta_p^2 = 0.056$ .

### ***Change in Eating Behaviors***

To examine whether there was also a change in self-reported eating behaviors from March-August of 2020 until September-December of 2021, I compared participants' self-reported disordered eating patterns across time. See Figure 2. The change did not reach significance for either uncontrolled eating ( $F(1,178) = 2.420, p = 0.122, \eta_p^2 = 0.013$ ) or emotional eating behavior,  $F(1,178) = 3.140, p = 0.078, \eta_p^2 = 0.017$ . In contrast, participants engaged in significantly more cognitive restraint in their eating at the time of the study than during the COVID-19 lockdown,  $F(1, 178) = 13.910, p < 0.001, \eta_p^2 = 0.072$ .

### ***Relationships between Eating Behaviors and Emotion States***

To address both primary hypotheses, I ran correlation analyses. First, I calculated correlations between emotional states during the COVID-19 lockdown and eating behaviors at that time. See Table 1. As participants reported more past depression, they also reported significantly more uncontrolled eating, cognitive restraint while eating and emotional eating (all  $ps \leq 0.003$ ). As participants reported increased anxiety in the past, they also reported significantly more uncontrolled eating and emotional eating (both  $ps \leq 0.034$ ), but the correlation with cognitive restraint did not reach significance. In addition to these relationships between emotional states and eating behaviors, both past uncontrolled eating and past emotional eating were significantly correlated with a weight change from March 2020 to the time of the study. Neither past stress nor concern about COVID-19 shared significant relationships with eating behaviors during the pandemic. I

next examined the relationships between change in emotional states across time and changes in eating behavior. See Table 2. There was no significant correlation between increases in stress and change in any of the three eating behaviors. An improvement in both depression and anxiety correlated with less emotional eating across time (both  $ps \leq 0.032$ ) but not with changes in uncontrolled eating or cognitive restraint.

### **Discussion**

This study sought to determine how depression, anxiety and stress affected eating behaviors of college women in the context of the COVID-19 pandemic. My two hypotheses were that the stress, depression, and anxiety triggered by COVID-19 would correlate with disordered eating among college-aged women and that improvements in the emotional state post COVID-19 would relate to improvements in eating behavior in women across time. I found substantial support for my first hypothesis and more limited support for my second hypothesis.

Not surprisingly, the high levels of depression, anxiety and stress that participants in this study reported experiencing during the pandemic replicates several past studies. Emotional states were worse during the COVID-19 original lockdown compared to eighteen months later. Dozois (2020) reported that the percentage of respondents who endured high to extremely high anxiety quadrupled and the percentage of respondents who experienced high depression doubled at the start of COVID-19. McGinty (2020) similarly found that in April 2020 the rates of distress were particularly high in young adults aged 18-29. These findings make sense as Corona Virus introduced new stressors into daily life, including health worries, loneliness, and isolation. All those factors are bound to decrease mental health wellness. Saltzman et. al (2020) found that social

support was a coping mechanism for COVID-19 and thus, a reduction in the isolation as the original pandemic evolved should correspond to decreased loneliness and mental health problems across time. Indeed, my research expanded on past studies and documented improved emotional states of college women 18 months after the lockdown.

When examining eating behaviors, uncontrolled and emotional eating did not significantly change across time points. Inconsistent with my hypothesis, cognitive restraint was higher at the time of the study than during the COVID-19 lock down. Bellisle (2001) found that women's cognitive restraint decreases in the presence of distractions. It is possible that the many cognitive and emotional distractions associated with COVID-19 decreased women's cognitive restraint while eating. When the women returned to campus and readjusted to collegiate life, distractions may have been more limited, allowing them the resources to restrain their eating once again.

To build on past studies, I also looked at how the emotional states impacted eating behavior in college women in the context of the COVID-19 pandemic. In support of my first hypothesis, my results showed that higher levels of depression and anxiety were associated with more uncontrolled and emotional eating and higher levels of depression were associated with more cognitive restraint. My findings were consistent with O'Connor et. al (2008) who found that daily hassles, such as stressful events, increased participants' emotional eating and unhealthy eating behavior in general. For my second hypothesis, improvements in depression and anxiety from Spring 2020 to Fall 2021 correlated with less emotional eating across time. These findings are consistent with those of past studies, that documented heightened risk for disordered eating in individuals with anxiety, depression, and a history of trauma (Russon et al. 2019). With anxiety and

depression having decreased since the pandemic, it would then also make sense for disordered eating to decrease as well.

### **Limitations**

Although the findings of this study largely supported my hypotheses, the results should be interpreted in the context of its limitations. First, the study included a small pool of women. Although representative of the university where the study was conducted, the sample was comprised of mainly White, upper middle-class women. Thus, future research should be done to determine whether the current results generalize to a broader, more heterogeneous population. Additionally, although there was a question about gender identity on the survey, not enough participants identified as nonbinary to analyze differences between these groups of women. Future studies could target women of different gender identities to determine the role of specific identities in the eating behavior of women during times of intense crisis. Secondly, the survey was lengthy. Some participants may have become bored or tired and may not have answered the questions attentively and carefully throughout the entire survey. Shorter, more focused surveys addressing similar research questions in the future may increase researchers' confidence in the accuracy of participants' responses. Third, the survey asked participants to look back and reflect on how they felt during the original March to August portion of the pandemic. Thus, because answers may change across time and participants may misremember their feelings and behaviors from the past, the current findings must be interpreted with caution.

## **Conclusions**

Taken together these results suggest different eating patterns of college women during times of high stress than normal stress. High stress resulted in more uncontrolled eating and emotional eating, whereas more typical stress corresponded with greater cognitive restraint. Together, these findings reinforce past research by showing that college-aged women are a particularly vulnerable population for disordered eating both during times of crisis and during their normal lives.

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Table 1

Correlations between emotional states and disordered eating behaviors during the COVID-19 lockdown period

	Past Eating Behaviors		
	Uncontrolled Eating	Cognitive Restraint	Emotional Eating
Past Depression	$r = 0.217^{**}$ $p = 0.003$	$r = 0.233^{**}$ $p = 0.002$	$r = 0.330^{***}$ $p < 0.001$
Past Anxiety	$r = 0.159^*$ $p = 0.034$	$r = 0.100$ $p = 0.181$	$r = 0.293^{***}$ $p < 0.001$
Past Stress	$r = 0.067$ $p = 0.369$	$r = 0.108$ $p = 0.152$	$r = 0.088$ $p = 0.243$
Concern About COVID-19	$r = 0.024$ $p = 0.755$	$r = 0.018$ $p = 0.807$	$r = 0.101$ $p = 0.178$
Weight Change	$r = 0.237^{**}$ $p = 0.001$	$r = 0.053$ $p = 0.479$	$r = 0.279^{***}$ $p < 0.001$

\*  $p < 0.05$

\*\*  $p < 0.01$

\*\*\*  $p < 0.001$

Table 2

Correlations between changes in emotional states and changes in disordered eating behaviors across time

	Change in Eating Behaviors		
	Uncontrolled Eating	Cognitive Restraint	Emotional Eating
Change in Depression	$r = 0.050$ $p = 0.504$	$r = 0.069$ $p = 0.361$	$r = 0.214^{**}$ $p = 0.004$
Change in Anxiety	$r = 0.049$ $p = 0.516$	$r = 0.095$ $p = 0.207$	$r = 0.160^*$ $p = 0.032$
Change in Stress	$r = -0.050$ $p = 0.507$	$r = 0.034$ $p = 0.654$	$r = 0.017$ $p = 0.821$

\*  $p < 0.05$

\*\*  $p < 0.01$

# Emotional Outcomes Across Time

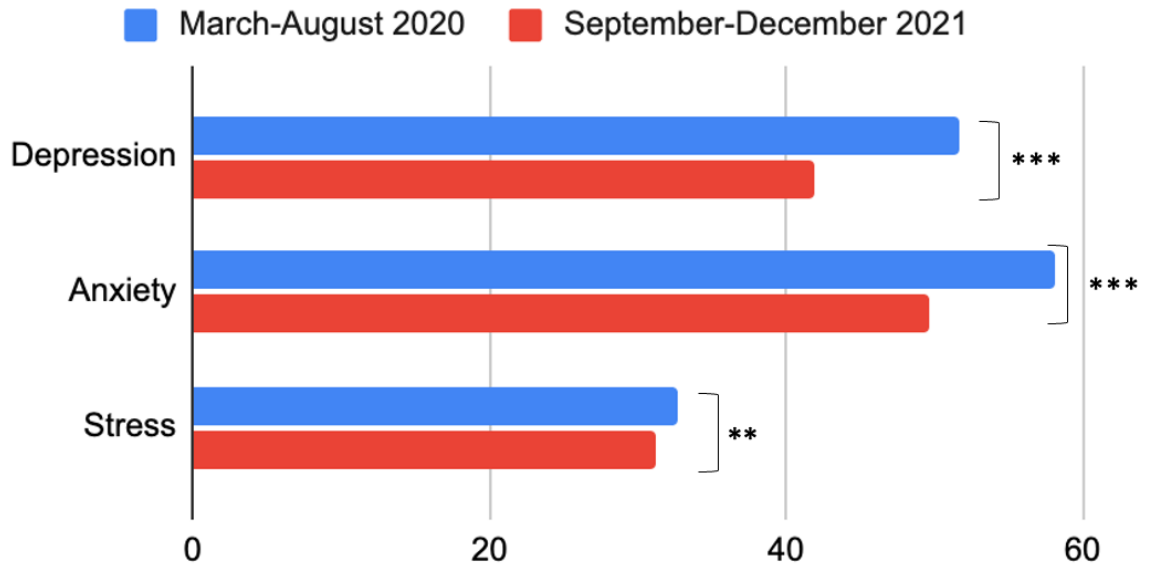


Figure 1. Differences in self-reported emotional states (depression, anxiety, and stress) from March-August 2020 to September-December 2021. All differences were statistically significant. \*\*  $p < 0.01$

\*\*\*  $p < 0.001$

## Eating Behaviors Across Time

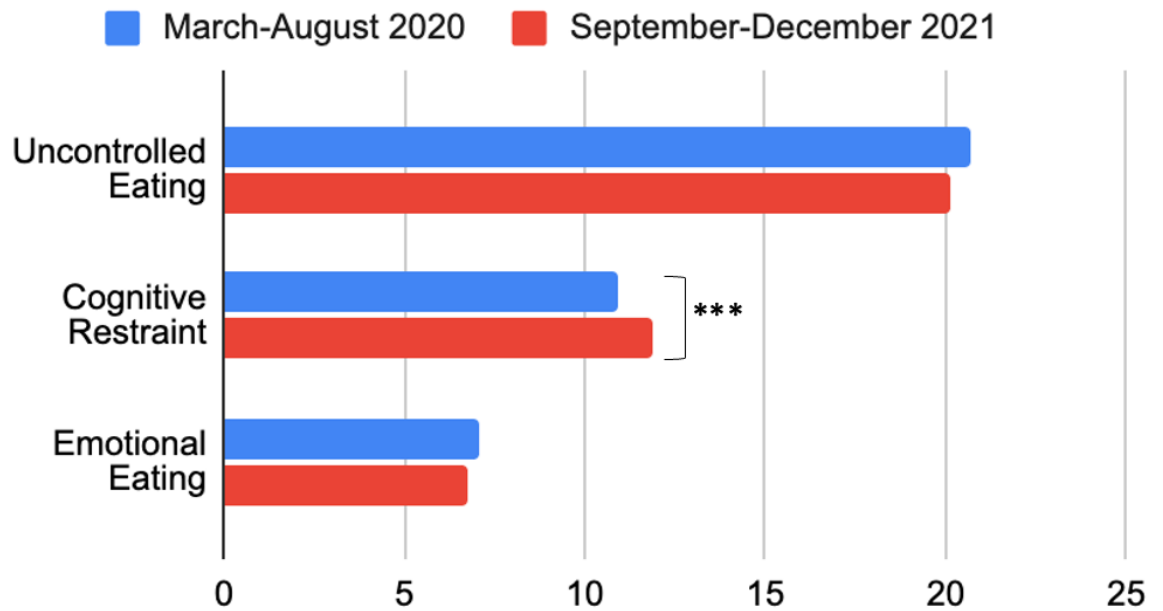


Figure 2. Differences in self-reported eating behaviors (uncontrolled eating, cognitive restraint, and emotional eating) from March-August 2020 to September-December 2021. The differences in uncontrolled eating and emotional eating were not statistically significant, while the difference in cognitive restraint were statistically significant. \*\*\*  $p < 0.001$