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The Effect of the COVID-19 Pandemic on how Social Media Use Influences Eating Disorders and Exercise Motivation

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**The Effect of the COVID-19 Pandemic on how Social Media Use Influences Eating
Disorders and Exercise Motivation**

by

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A Thesis submitted to the Department of Psychology
in partial fulfillment of the requirements for the degree of

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UNIVERSITY OF NORTH FLORIDA

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Abstract

The COVID-19 pandemic has drastically impacted the life of every individual. Stay-at-home orders imposed to control the spread of the virus have only led to an increase in social media use to stay connected with others. College students were particularly affected by the measures put in place to control the spread of COVID-19 due to geographical, social, and economic changes (Aristovnik et al., 2020). The stress caused by these changes can increase eating disorder symptoms (Lacey et al., 1986) and exercise behaviors (Kim & McKenzie, 2014). The aim of the study is to observe the impact of the COVID-19 pandemic on how social media use influences eating disorders and exercise behaviors. The current study proposed that due to the pandemic, increased social media use will lead to increased eating disorder symptoms and affect exercise motivation. One hundred and ninety primarily Caucasian ($n = 114$), female ($n = 169$) students aged 18-45 were assessed on social media use and responded to the Eating Disorders Examination Questionnaire 6.0, the Exercise Motivation Inventory 2, the Fear of COVID-19 Scale, the Perceived Stress Scale, and the U.S. Household Food Security Scale. The results revealed that fear of COVID-19, EDE-Q score, and exercise motivation did not differ between high and low Instagram users. Furthermore, fear of COVID-19 did not moderate the relationship between Instagram use and EDE-Q score or exercise motivation. Although non-significant, these results indicate that there is a need for further investigation, specifically in the US, for how the pandemic has impacted the lives of college students.

Keywords: social media, Instagram, eating disorder, exercise, COVID-19, college

The Effect of the COVID-19 Pandemic on how Social Media Use Influences Eating Disorders and Exercise Frequency

COVID-19

In January 2020, the World Health Organization (WHO) declared a global health emergency in response to the spread of coronavirus (COVID-19) (Velavan & Meyer, 2020). Due to the vast spread of the virus, COVID-19 was classified as a pandemic (WHO, 2010). COVID-19 is an infectious disease that leads to respiratory illness (WHO, n.d.) Due to the method of transmission of COVID-19, the use of masks and social distancing measures were imposed (Centers for Disease and Prevention, 2021). The inability to stop or limit the spread of COVID-19 increased feelings of uncertainty about the end of the pandemic. Intolerance of uncertainty has been associated with an increase in anxiety and depression (Carleton et al., 2021). The need for social distancing led to layoffs which therefore increased financial stress for many people (Park et al., 2020). Although individuals of all ages were affected by the pandemic, the college population faced a unique set of challenges. Furthermore, the physical effects of the pandemic on college students were known from the start, but the psychosocial toll in this population is still being addressed.

COVID-19 and College Students

The impact of the COVID-19 pandemic on college students is unique due to the diverse population that makes up this group (Lederer et al., 2020). This population faces a distinct set of challenges related to the changes caused by the pandemic (Aristovnik et al., 2020). One of the major changes was the closure of universities which forced students to move in with family members and left many students homeless (Schiff et al., 2020). For LGBTQ+ individuals, living at home led to increased anxiety and distress if the home environment was unsafe (Gonzales et

al., 2020). Caregiving responsibilities of students who moved in with family members could be increased due to all members of a family living, working, or learning from home (Lederer et al., 2020). Furthermore, fully remote courses require students to rely on technology, but socioeconomic status can affect which students have access to the necessary equipment for this new format (Aristovnik et al., 2020). With all the unique obstacles added to the lives of college students, Copeland and colleagues (2020) determined that first- year college students displayed an increase in externalizing problems and attention problems since the start of the pandemic. Symptoms of depression and anxiety in this group were increased, but the rates were three times higher if a family member was infected with COVID-19 (Wang et al., 2020). Low-income college students were more likely to experience changes to their academic performance and delay their graduation (Aucejo et al., 2020). Higher levels of depression and anxiety were observed in students with a low socioeconomic status (Rudenstine et al., 2021). The inability to be on campus caused the non-academic experiences that universities have to offer to be inaccessible and this took away from the overall well-being of the students (Peltier et al., 2000). Feelings of belonging and social support that these non-academic experiences provide could help mitigate the negative psychological effects of college (McIntyre et al., 2018).

Social Isolation

Social isolation is the physical or psychological distancing of an individual from his or her social network (Biordi & Nicholson, 2013). The high transmission rate of COVID-19 led to the need for lockdowns and social distancing measures (Caulkins et al., 2020) and although it was necessary, the effects of social isolation on the mental health of vulnerable populations such as ethnic minorities, the elderly, and the poor was detrimental (Cacioppo & Hawkey, 2003). An increase in psychological disorders such as anxiety, insomnia, and digestive problems can all be

a result of social isolation (Pietrabissa & Simpson, 2020). More specifically, diet and exercise can be affected by periods of isolation. For university students, the closure of on-campus fitness centers and dining halls prevented those who relied on them from using them. Additionally, when in social isolation, females reported increased snacking compared to males (Gallo et al., 2020). Increased stress due to the pandemic could have led individuals, specifically females, to engage in stress-eating (Gallo et al., 2020). Being in a different environment not surrounded by your peers can also influence the way a person consumes food. Gallo and colleagues (2020) determined that for females, being surrounded by mixed-sex peers, can influence them to eat less. Social support can help buffer the negative physical and psychological effects from social isolation by increasing feelings of connectedness and solidarity (Moore & March, 2020). However, perceived social support only buffered the negative effects of social isolation when isolation time was low and worry about COVID-19 was high (Szkody et al., 2020). The use of technology has become a coping tool during the pandemic by helping individuals stay connected even when they cannot physically be together (Saltzman et al., 2020). Additionally, social networks can increase resilience to trauma and stress (Saltzman et al., 2020).

Stress and COVID-19

Since the onset of the COVID-19 pandemic, stress levels have increased in all aspects of life (Son et al., 2020). Increased stress is concerning because stressful events have been established as a risk factor for anxiety and depression (Hammen, 2005; Kujawa et al., 2020; Rapee, 1991). The onset of the COVID-19 pandemic has left young adults more anxious and concerned with how COVID-19 will affect their futures (Klaiber et al., 2021; Nwachukwu et al., 2020). University students reported three main areas of concern in relation to the pandemic: transition to remote learning, missing out on important milestones such as graduation, and work

or finances (Halliburton et al., 2021). This is concerning because college students are particularly vulnerable to the effects of the pandemic due to increased levels of mental health issues in this group (Lipson et al., 2019). Psychological distress is associated with poor academic performance, but this association could be exacerbated with the addition of stress related to COVID-19 (Grubic et al., 2020). Compared to data collected prior to the onset of the COVID-19 pandemic, both the level of perceived stress and alcohol use in college students have increased (Charles et al., 2021). In order to combat the negative effects of the pandemic, the ability to cope with new, stressful situations could play a crucial role. The two types of coping that could help alleviate stress are problem focused strategies and emotion focused strategies (Brougham et al., 2009). Problem focused strategies consist of planning and actions and have been associated with positive outcomes (Brougham et al. 2009). Emotion focused strategies consist of expressing emotions and changing expectations and have been associated with negative outcomes (Brougham et al., 2009). Furthermore, the levels of stress felt by college students differed by gender and sexual orientation (Hoyt et al., 2021). Females and sexual minorities experienced a worse overall well-being compared to males and heterosexual peers, but this difference could be due to social norms and the inability to access support groups (Hoyt et al., 2021).

Social Media Use

Social media use is defined as personal and public communication on networked communication platforms that is based on the internet (Miekle, 2016). The rate of social media use has only increased as new social media platforms are created (Clement, 2019). The average person in 2018 spent 138 minutes a day using social media (Clement, 2019). Although social media has many positive aspects to it such as staying connected with friends and family and positive coping behaviors (Moore & March, 2020), use of multiple social media platforms has

been associated with symptoms of depression and anxiety in people aged 19 to 32 (Primak et al., 2017). Furthermore, the addictive nature of social media can lead to it being misused. The misuse of social media has been associated with increased anxiety and depression (Haidt & Allen, 2020). If social media is used properly in the form of positive interactions and good quality social support, then the use of social media is negatively correlated with anxiety (Seabrook et al., 2016).

By comparing oneself to others on social media, negative feelings, behaviors, thoughts, and physical sensations can increase (Warrender, 2020). Social comparison is the behavior of comparing ourselves to others to determine our sense of self (Festinger, 1954). The two types of social comparison are upward social comparison and downward social comparison (Festinger, 1954). Downward social comparisons can increase self-esteem by making an individual feel better about themselves because others are worse off (Festinger, 1954). However, upward social comparisons can decrease self-esteem by making an individual feel like they are worse off than others (Festinger, 1954). This is particularly relevant when it comes to social media use due to the ability to connect with people from many different backgrounds and the need for people to present their best self online (Warrender, 2020).

Eating Disorders

Eating disorders are a mental disorder that are characterized by a consistent disturbance in eating or behavior related to eating that changes how food is consumed (American Psychological Association [APA], 2013). Eating disorders affect both physical health and psychosocial functioning (APA, 2013). Individuals with a higher BMI are more likely to develop an eating disorder (Babio et al., 2009). The prevalence of eating disorders is on the rise with at least 20 million women and 10 million men developing an eating disorder within their lifespan

(Wade et al., 2011). Eating disorders are classified as either threshold eating disorders (TED) or other specified feeding or eating disorders (OSFED) (APA, 2013). TED consists of anorexia nervosa, bulimia nervosa, and binge eating disorder. Anorexia nervosa (AN) is characterized by a limiting of energy intake, a fear of weight gain, and a disturbed view of one's body shape or weight (APA, 2013). The diagnostic criteria for AN are failure to maintain weight, behaviors preventing weight gain, and an unrealistic view of weight or refusal to acknowledge low body weight (Moskowitz & Weiselberg, 2017). AN has two subtypes: restricting and binge-eating/purging. Bulimia nervosa (BN) is characterized by recurrent periods of binge eating, recurrent inappropriate measures to prevent weight gain, and self-evaluation that is solely based on body shape and weight (APA, 2013). Recurrent is defined as occurring repeatedly (Merriam-Webster, n.d.). Binge eating is defined as the consumption of a large amount of food, often in a compulsory manner (Mitan, 2008). Binge eating disorder (BED) is characterized by recurring episodes of binge eating in which a person eats a larger than normal amount of food as compared to the average person (APA, 2013). Binge eating episodes meet three or more of the following criteria: consuming food at a faster pace than normal, consuming food until experiencing an uncomfortably full feeling, consuming food when not hungry, consuming food alone due to embarrassment of how much food is being consumed, and feeling guilty, depressed, or disgusted afterwards (APA, 2013).

Anorexia Nervosa

According to the APA, AN affects females at a higher rate than males in the United States with a ratio of 10:1 and 0.4% of females are affected during a twelve-month period. The suicide rate per year for AN is higher than other mental disorders at 12 per 100,000 (APA, 2013). AN normally presents itself during or before adolescence and although rare, cases before puberty

or after the age of 40 have been documented (APA, 2013). The presence of anxiety disorders or obsessional traits in childhood increase the risk for developing AN (APA, 2013). Dellava and colleagues (2010) found that women diagnosed with AN reported having childhood anxiety. Additionally, higher levels of intense exercise have been associated with AN before or during the diagnosis (Davis et al., 1997; Peñas-Lledó et al., 2002). A culture that promotes thinness or an occupation that values thinness could increase the risk for developing AN (APA, 2013). AN used to be considered only a Western culture issue due to the value of thinness, but now AN is seen as an issue that can occur in non-Western cultures (Simpson, 2002). Cases of AN diagnoses that are separate from a desire to be thin have been documented in China, India, Malaysia, Taiwan, Hong Kong, and Singapore (Simpson, 2002). Thin body types were glamorized at the start of the 21st century, but now more thin, muscular body types are being glamorized. Female undergraduates increased their ratings of thinness and muscularity of images from Miss USA pageants from 1999 to 2013 (Bozsik et al., 2018).

Bulimia Nervosa

Binge eating periods for those diagnosed with BN is characterized by consuming an amount of food that is larger than what the average person would eat during a similar time period without any self-control (APA, 2013). The APA says to meet the criteria for BN instead of AN, any bulimic behaviors should not occur during episodes of AN. Furthermore, bulimic behaviors occur, on average, at least once per week for a period of 3 months. The twelve-month prevalence rate for this eating disorder among young females is 1%-1.5% and the male to female ratio is 1:10 (APA, 2013). The APA determined that the onset of this eating disorder is during young adulthood or adolescence and diagnoses before puberty or after the age of 40 are rare. The use of inappropriate measures such as dieting, excessive exercise, and purging (Anderson & Bulik,

2013) to control weight gain and reduce feelings of guilt or shame for those diagnosed with BN is referred to as compensatory behaviors (Colleen Stiles-Shields et al., 2012). The onset of BN can be caused by multiple stressful life events or before or after a period of dieting for weight loss (APA, 2013). Additionally, symptoms of BN can occur due to peer or parental influence on ideal body type (Linville et al., 2011; Blodgett & Gondoli, 2011). With the development of social media, peer influences can occur without the physical presence of peers. Through eye movement tracking, Blechert and colleagues (2009) found that when participants who were diagnosed with BN looked at images of themselves and comparison bodies, they spent more time looking at pictures with lower BMI and engaged in more upward comparisons than the controls. Feelings of concern about weight or guilt associated with postponing exercise can lead to excessive exercise in patients with BN (Mond et al., 2006).

Binge Eating Disorder

During an episode of binge eating, there is a lack of control felt by the individual. The binge eating episodes occur on average at least once a week for three months, do not have reoccurring use of inappropriate behaviors like BN, and are separate from episodes of BN and AN. The twelve-month prevalence rate for BED in US females and males aged 18 or older is 1.6% and 0.8% respectively (APA, 2013). The onset of the first binge eating episode can be preceded by dieting or fasting (Spurrell et al., 1997; Stice et al., 2008). Rates of BED are as prevalent among females of racial or ethnic minorities as they are among white females (APA, 2013). Unlike AN or BN, BED begins during or after adolescence. During this time, the tendency to be impulsive can be increased (Romer, 2010). Impulsivity, specifically food-related reward sensitivity and spontaneous behavior, was increased in those diagnosed with BED compared to a non-clinical group (Schag et al., 2013). Colles and colleagues (2008) determined

that a loss of control overeating was the most common marker of psychological distress. The rate of social media use is also elevated during adolescence (Rideout, 2015). Symptoms of BED were significantly related to body dissatisfaction in young women who used Facebook, Snapchat, and Instagram and this puts them at risk for developing an eating disorder (Saunders & Eaton, 2018). This relationship could be a result of sociocultural pressures that increase upward comparison and body surveillance, or a focus on appearance (Saunders & Eaton, 2018). Furthermore, BED is growing increasingly comorbid with mood disorders, anxiety disorders, and suicidal symptoms (Mitchell & Peterson, 2005).

Other Specified Feeding or Eating Disorder

Eating disorder behaviors that do not meet the criteria for AN, BN, or BED fall under the category of other specified feeding or eating disorder (OSFED). This category includes atypical anorexia nervosa, bulimia nervosa of low frequency and/or limited duration, binge-eating disorder of low frequency and/or duration, purge disorder, and night eating syndrome (APA, 2013). Atypical anorexia nervosa meets all the criteria of AN besides weight below the normal range (APA, 2013; Moskowitz & Weiselberg, 2017). Behaviors associated with bulimia nervosa and binge-eating disorder of low frequency and/or duration occur on average less than once a week for three months (Fairweather-Schmidt & Wade, 2014). Purging disorder is when purging behavior reoccurs to change weight or shape with no association to binge eating (APA, 2013). Night eating syndrome is classified by night eating either after the evening meal or in the middle of the night and is not explained by BED or any other mental disorder (APA, 2013).

Stress and Eating Disorders

The COVID-19 pandemic is a stressful life event for many individuals due the possibility for many life changes to occur suddenly and at once. Stressful life events can put a person at risk

for developing an eating disorder (Hubert Lacey et al., 1986; Johnson et al., 1982; Margo, 1985). While a mild level of stress is good and can help motivate a person, too much stress can increase the risk for negative coping mechanisms (Yau & Potenza, 2013). Females who have an emotion focused coping style or an avoidant coping style were positively associated with binge eating when stressed (Sulkowski et al., 2011). A person's response to stress was also influenced by whether a person was an emotional eater. Emotional eaters reported overeating during times of stress while non-emotional eaters reported undereating during times of stress (Wallis & Hetherington, 2009). Increased stress, whether it was external or just perceived, led women who ranged from normal weight to obese to increase their food intake (Groesz et al., 2012). 58% and 77% of onsets of AN and BN respectively occurred after experiencing a stressful life event related to health, relationships, unemployment, bereavement, finances, or crime (Troop & Treasure, 1997). Weight gain during the COVID-19 pandemic has been referred to as the "quarantine 15" (Pearl, 2020). Increased time spent at home led people to take part in behaviors such as eating in response to stress, disturbed sleep, and snacking that could increase weight gain (Zachary et al., 2020). On the other hand, increased fear about the COVID-19 pandemic was associated with more restraint when it comes to eating (Haddad et al., 2020).

College Students and Eating Disorders

The transition from high school to college is a challenging time due to the many changes that occur simultaneously (Arnett, 2001). The stress from geographic, social, and economic changes can lead students to experience mental health issues such as anxiety and depression and this in turn could lead to symptoms of eating disorders (Bennett et al., 2013; Sulkowski et al., 2011). Eisenberg and colleagues (2011) determined that 9% to 13% of females and 3% to 4% of males reported symptoms of eating disorders and these symptoms were more likely to occur with

depression and anxiety. This relationship could be exacerbated in high-risk individuals. College students in France who are at risk for developing an eating disorder reported higher levels of stress and experienced more symptoms of depression (Tavolacci et al., 2015). Ethnic minorities in college already have a higher risk for developing anxiety and depression due to pressure from society (Zvolensky et al., 2016). The Greek life culture can promote a specific body type the members feel pressured to achieve or maintain. Compared to their non-sorority peers, college females who joined a sorority reported higher levels of a drive for thinness (Allison & Park, 2004).

Eating Disorders and Social Media Use

Social networking sites have created a social environment that places a greater focus on body image and appearance (Thompson et al., 1999). This focus on body image and appearance combined with messages from peers and family members can lead to an individual feeling dissatisfied with their body (Sinton et al., 2012). Young women who are exposed to accounts that focus on appearance reported higher drive for thinness (Cohen et al., 2017). Furthermore, access to pro-anorexia content on social media apps like Instagram can put a susceptible individual at a higher risk of either engaging in disordered eating or worsening eating disorder symptoms (Ging & Garvey, 2018). Exposure to images of multiple body types can lead to both upward and downward social comparisons. Upward social comparisons can lead an individual to take part in negative eating behaviors to match the ideal body type that is being promoted on social media platforms (Rogers & Melioli, 2016). Since the onset of the pandemic, individuals have only increased their use of social media due to social distancing measures (Samet, 2020). Increased social media use has been linked to higher eating disorder symptoms and concerns (Santarossa & Woodruff, 2017; Sidani et al., 2016).

Food Insecurity in College Students

Food insecurity is an issue that many college students have faced since before the onset of the COVID-19 pandemic. The U.S. Department of Agriculture (2014) defines food insecurity as reduced caloric intake, reduced weight due to lower caloric intake, access to a limited variety of food, feelings of hunger without eating, and limited access to healthy foods. The prevalence rate of food insecurity among college students is almost four times higher than the rate among U.S. households (Nazmi et al., 2019; Mialki et al., 2021). Knowing this, it is important to look at the relationship between food insecurity and eating disorder symptoms. This relationship could help explain why some people develop eating disorder. Those who experience increased food insecurity report increased binge eating, eating disorder symptoms, and concern about weight (Becker et al., 2017). Furthermore, the cost of meal plans in universities has only increased throughout the years and college students are paying more for three meals per day than those not in college (Mathewson, 2017). Consequently, college students from Arizona State University who were able to afford the unlimited meal plan option reported lower levels of food insecurity (Van Woerden et al., 2019). A lower socioeconomic status can put a college student at risk for becoming food insecure and financial aid does not seem to buffer this relationship (Payne-Sturges, 2018). This issue only increased after the onset of the pandemic due to many college students not being able to qualify for financial assistance (Mialki et al., 2021). Additionally, measures put in place to mitigate the spread of the COVID-19 virus took away the on-campus dining option for students who relied on it (Mialki et al., 2021). Living arrangements and job change or loss were the strongest predictors for food insecurity in a college population (Owens et al., 2020).

Exercise

WHO defines exercise as any form of physical activity (Physical activity, n.d.). This includes walking, recreation or play, sports, or cycling (Physical activity, n.d.). The benefits of exercise include prevention and management of certain diseases and cancers (Physical activity, n.d.). Exercise can not only improve physical health but can also improve mental health by increasing overall well-being, increasing a positive mood, and reducing anxiety and depression (Reed & Ones, 2006). However, the misuse or excessive use of exercise can lead to burnout, illness, and a compromised immune system (Smith, 2003). Excessive exercise is defined as exercise that is more than necessary for an individual due to factors such as genetics or fitness level (Smith, 2003). Unhealthy exercise as a form of weight loss seems to be increasing because of pressure from society to look a certain way (Lowry et al., 2005). The motive behind engaging in exercise can vary between individuals. Females who were internally motivated to engage in exercise were less likely to engage in disordered eating behaviors (Gast et al., 2015). However, females that were externally motivated to engage in exercise were more likely to engage in restrictive eating behaviors (Gast et al., 2015). Females with a higher BMI reported increased feelings of body dissatisfaction as a motive for exercise (Hausenblaus & Fallon, 2002).

Exercise and Social Media Use

The inability to interact with people face-to-face led to more time spent using social media (Cooper et al., 2020). Increased use of social media has been associated with negative outcomes such as depression, anxiety, and decreased sleep quality (Cain, 2018; Lin et al., 2016). On the other hand, Colley and colleagues (2020) determined that limiting screen time and increasing exercise outdoors was associated with better mental health, however this effect was more pronounced in women. Furthermore, exercise can produce positive outcomes through a combination of psychological and neurobiological mechanisms (Mikkelsen et al., 2017; Ströhle,

2009). During the lockdown, people took to social media sites like Instagram and Pinterest to find new ways of exercising at home. Survey data collected from multiple different countries between March and May of 2020 showed that people either maintained or increased the amount of exercise they did (Brand et al., 2020). Increased use of social media can also increase exposure to fitness related images. While these images can inspire and motivate people to work out, they can also lead to greater weight concern (Burke & Rains, 2019). For young women, exposure to fitness related posts can also lead to disordered eating (Graff & Czarnomska, 2019). Therefore, it is concerning that the rate of fitspiration, or images focused on a muscular body type, is increasing (Murashka et al., 2020). In addition to promoting a specific body type, fitspiration also promotes dieting in an unhealthy manner (Boepple & Thompson, 2015). Fitspiration can have similar messages to blogs or websites that promote a pro-anorexia lifestyle (Jennings et al., 2020). Fitspiration can also have negative effects on the individuals posting these images with women who post fitspiration reporting a higher drive for thinness (Holland & Tiggemann, 2017). However, pro-anorexia websites have an even more negative effect on women with women in a non-clinical population reporting higher feelings of anxiety after viewing these websites. (Jennings et al., 2020).

College Students and Exercise

Weight gain during the first two years of college is common due to sedentary behaviors and unhealthy eating that occurs during this time (Racette et al., 2005). Even though college students have free access to fitness facilities on campus, giving them the opportunity to exercise whenever they want to, the motivation for college students to utilize these facilities can be influenced by the amount of schoolwork, other commitments or interests, and laziness (Ebben & Brudzynski, 2008). Additionally, college students can access television shows from anywhere on

campus and the intrigue of video games can affect exercise motivation (Nabi & Thomas, 2013). The ability for college students to choose how they spend their time can be both freeing and stressful. If a loss of control is felt by college students due to multiple responsibilities, it can manifest into revenge bedtime procrastination. Revenge bedtime procrastination is a phenomenon in which a person refuses to go to sleep in a timely manner to regain a sense of control over their life (Liang, 2020). Technology makes it easier to partake in revenge bedtime procrastination. The ability to easily scroll through posts and switch between the multiple phone applications available only increases the time spent procrastinating sleep (Marples, 2021).

Stress and Exercise

Exercise can be a positive way for college students to relieve stress. Kim and McKenzie (2014) determined that exercise helped students cope with stress and it was more effective in reducing stress than other forms of leisure. For individuals at risk of developing issues related to body image, exercise as a form of stress relief may not be as beneficial (Sala et al., 2017). Individuals with more negative eating attitudes reported that exercise resulted in negative outcomes whereas individuals with less negative eating attitudes reported that exercise resulted in positive outcomes (LePage & Crowther, 2010). Secondary dependence on exercise is the use of exercise to maintain weight gain and reduce any negative feelings associated with body image disturbance (Hausenblaus & Fallon, 2002).

Summary of Previous Literature

Rates of anxiety and depression have increased due to the uncertainty and fear of the COVID-19 pandemic (Carleton et al., 2021). Although individuals of all ages were affected, college students were uniquely impacted due to all the changes that occur during the transition from high school to college (Aristovnik et al., 2020). Social distancing measures put in place to

slow the spread of the virus led to feelings of social isolation which only exacerbated the negative effects of the pandemic. To remain in contact with friends and family, the use of social media increased (Saltzman et al., 2020). Increased social media use has been associated with stress and anxiety which can in turn produce eating disorder symptoms and increase exercise frequency (Santarossa & Woodruff, 2017; Sidani et al., 2016). This relationship exists through upward social comparisons. Upward social comparisons decrease self-esteem, and an individual can partake in negative eating behaviors and misuse exercise to achieve a certain body type (Rogers & Melioli, 2016). This is concerning since the prevalence of eating disorders has been increasing. The COVID-19 pandemic is a major life event that increased stress for everyone. Stressful life events have been determined to play a crucial role in the development of eating disorders (Lacey et al., 1986; Johnson et al., 1982; Margo, 1985). Furthermore, rates of eating disorders have been increasing in the college populations with minorities being particularly affected (Zvolensky et al., 2016). The COVID-19 pandemic only increased rates of food insecurity for college students who relied on university dining. While exercise can positively affect an individual such as increasing cardiovascular health and decreasing levels of stress, the misuse of exercise can lead to negative effects (Reed & Ones, 2006). Exercise might also not be beneficial to those at risk for developing an eating disorder due to the inability to properly engage in exercise (Sala et al., 2017). College students have free access to fitness facilities but may lack the motivation to exercise due to other responsibilities (Ebben & Brudzynski, 2008). Additionally, college students may partake in revenge bedtime procrastination which can lead to poorer sleep quality (Liang, 2020).

Gaps in Previous Literature

Previous literature has not yet fully examined the impact of COVID-19 on how social media use influences eating disorders and exercise frequency in the college population. The multiple changes that occurred in response to the pandemic could have affected what is currently known about social media use, eating disorders, and exercise. The pandemic has forced individuals to rely heavily on social media to stay connected with friends and family. Most of the studies conducted on this topic are from other countries and are focused on healthcare workers, therefore it is essential to observe the effects of the pandemic in the United States. Studies conducted in other countries also do not capture how COVID-19 prevention policies in the United States affected the attitudes of the people living here.

Hypotheses

Aim 1. Examine the relationship between COVID-19 stress and social media use.

Hypothesis 1. It was hypothesized that those individuals with low social media use (Instagram) would report lower levels of COVID-19 stress.

Aim 2. Examine the relationship between social media use and eating disorder behaviors and exercise motivations.

Hypothesis 2. It was hypothesized that those with high social media use (Instagram) would exhibit more eating disorder behaviors (higher score on the EDE-Q).

Hypothesis 3. It was hypothesized that those with high social media use (Instagram) would report higher levels of both external and internal exercise motivation.

Aim 3. Observe the moderating effect of COVID-19 stress on the relationship between social media use and eating disorder behaviors and exercise motivation.

Hypothesis 4. It was hypothesized that COVID-19 stress would moderate the relationship between Instagram use and EDE-Q score such that those with higher COVID-19 stress would have a stronger relationship between Instagram use and EDE-Q score.

Hypothesis 5. COVID-19 stress will moderate the relationship between social media use (Instagram) and both internal and external exercise behaviors such that those with higher COVID-19 stress would have a stronger relationship between social media use (Instagram) and both external and internal exercise motivation.

Aim 4. Examine the relationship between perceived stress and social media use

Hypothesis 6. It was hypothesized that those individuals with low social media use (Instagram) would report lower levels of perceived stress.

Aim 5. Observe the difference in exercise motivation for those with high and low levels of eating disorder behaviors.

Hypothesis 7. Those with increased levels of eating disorder behaviors will have higher internal and external exercise motivation.

Aim 6. Observe the moderation effect of BMI on eating disorder behaviors and exercise motivation.

Hypothesis 8. BMI will moderate the relationship between EDE-Q score and exercise motivation such that those with a higher BMI will have a stronger relationship between EDE-Q score and both internal and external exercise motivation.

Methods

Participants

An a priori analysis was conducted using G*power to determine the number of participants needed for an independent samples t-test to detect a difference between two groups. At 95% power, a sample size of 210, 105 in each group, is required to detect a medium effect. Running a post hoc test revealed that the current study had 64% power with the 179 participants in the two groups. There were 25 participants below the EDE-Q cutoff score and 154 participants above the EDE-Q cutoff score. In this study, 190 undergraduate students at a midsize public university in the southeast United States were recruited through SONA, a research participation system used in psychology. Participants received SONA credits for participating in this study. Participants were categorized by age, sex, ethnicity, BMI category, and level of food insecurity. Instagram use was an exclusionary factor for the study. The college population is important to study due to the unique risks that the COVID-19 pandemic poses on college students (Lederer et al., 2020).

Measures

Demographics

Participants were asked demographic questions pertaining to sex, gender, age, ethnicity, weight, and height, and daily Instagram use. Height and weight were converted into BMI scores. Items from this measure can be found in Appendix A.

Eating disorders

The Eating Disorder Examination Questionnaire 6.0 (EDE-Q 6.0) (Fairburn & Beglin, 2008) was used to assess eating disorder pathology. The EDE-Q 6.0 is a 28- item measure. The EDE-Q 6.0 consists of 4 subscales. These subscales are Restraint ($\alpha = .84$), Eating Concern ($\alpha = .79$), Shape Concern ($\alpha = .91$), and Weight Concern ($\alpha = .85$). The EDE-Q total Cronbach's alpha in the current study was .90. A cutoff of 2.3 is suggested in order to discriminate between those

with and without an eating disorder (Mond et al., 2004; Brockmeyer et al., 2013). Items 1-12 and 19 were rated on a scale of 0 (*no days*) to 6 (*every day*). Items 13-18 were free responses. Item 20 was rated on a scale of 0 (*none of the time*) to 6 (*every time*). Items 21-28 were rated on a scale of 0 (*not at all*) to 6 (*markedly*). Previous research using the EDE-Q 6.0 in a college population found an internal consistency ranging from .70 to .93 (Berg et al., 2012). The EDE-Q 6.0 and the Stirling Eating Disorders Scale were correlated well with each other, specifically in an adolescent group (Mitchell & Peterson, 2005). Items from this measure can be found in Appendix B.

Exercise

The Exercise Motivation Inventory 2 (EMI 2) (Markland & Ingledew, 1997) was used to measure exercise motivation. The EMI 2 is a 51-item measure. The items were rated on a 6-point Likert scale ranging from 0 (*not at all true for me*) to 5 (*very true for me*). The EMI 2 consists of 14 subscales all with a Cronbach's alpha in the range of .69 to .92 (Markland & Ingledew, 1997). 5 of the 14 subscales were used in the current study. These 5 subscales are Health Pressure, Ill-health Avoidance, Positive Health, Weight Management, and Appearance (Markland & Ingledew, 1997). Health Pressure, Ill-health Avoidance, and Positive Health were summed to create the variable External Motivation. Weight Management and Appearance were summed to create the variable Internal Motivation. In the current study, the 5 subscales used had Cronbach's alphas in the range of .59 to .92. Previous research using the EMI 2 in a college population found an internal consistency of above .71 (Maltby & Bay, 2001). Items from this measure can be found in Appendix C.

Fear of COVID-19

The Fear of COVID-19 Scale (FCV-19S) (Ahorsu et al., 2020) was used to measure fear of COVID-19. The FCV-19S is a 7-item measure. The items were rated on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The total score is calculated by adding up the responses to each question with 7 being the lowest possible score and 35 being the highest possible score (Ahorsu et al., 2020). A higher score indicates a greater fear of COVID-19 (Ahorsu et al., 2020). Some research has suggested a cutoff score in the range of 16 to 18, however these were not for a US population (Mohsen et al., 2022; Nikopoulou et al., 2020). A one sample t-test was conducted comparing the mean from the current study to the mean from the study by Perz and colleagues (2020). The results indicated that there was a higher fear of COVID-19 in the current sample ($M = 13.2$, $SD = 6.06$) compared to the population as a whole, $t(186) = -11.06$, $p = .00$. Previous research using the FCV-19S in a college population found an internal consistency of .91 (Perz et al., 2020; $\alpha = .89$ in the current sample). Items from this measure can be found in Appendix D.

Food security

The U.S. Household Food Security Survey (Blumberg et al., 1999) was used to determine food insecurity status. The U.S. Household Food Insecurity Survey is a 2-item measure (Hager et al., 2010). Participants who answer “Often true” or “Sometimes true” to either one or both items are classified as food insecure. Participants who answer “Never true” to both items are classified as food secure. The two-item version of the U.S. Household Food Insecurity Survey is consistent with the six-item version and has demonstrated good reliability (Radandt et al., 2018; $\alpha = .76$ in the current sample). Items from this measure can be found in Appendix E.

Perceived stress

The Perceived Stress Scale 4 (PSS-4) is used to measure stress (Cohen & Williamson, 1988). It is a 4-item measure (Cohen & Williamson, 1988). The items are rated on a 5-point Likert scale ranging from 0 (*never*) to 4 (*very often*) (Cohen & Williamson, 1988). Items 3 and 4 are reverse scored with Never being 4 and Very Often being 0 (Cohen & Williamson, 1988). Previous research using the PSS 4-item measure in a college population found an internal consistency of .83 (Harrer et al., 2018; $\alpha = .74$ in the current sample). Items from this measure can be found in Appendix F.

Data Analysis Plan

The responses collected from the Demographics questionnaire, the Eating Disorder Examination Questionnaire 6.0, the Covid Stress Scales questionnaire, the Food Insecurity questionnaire, and the Perceived Stress Scale were analyzed using the Statistical Package for the Social Sciences (SPSS Version 25) and Hayes PROCESS Macro model 1.

Preliminary analyses. Descriptive statistics were conducted using sex, gender, ethnicity, BMI, Instagram use, EDE-Q score, exercise motivation, COVID-19 stress, perceived stress, and food security status. Means, ranges, and correlations of all variables besides Instagram use and food security status were conducted. The relationship between food security status and fear of COVID-19, perceived stress, and EDE-Q score was also observed. Additionally, ethnicity was looked at in relation to the EDE-Q, internal motivation, external motivation, fear of COVID-19, and perceived stress.

Main analyses. Independent samples t-tests were used to analyze the relationship between social media use (Instagram) and COVID-19 stress, eating disorder behaviors, and both internal and external exercise motivation. An independent samples t-test was also used to analyze the relationship between perceived stress and social media use

(Instagram). Moderation analyses were used to observe the moderating effect of fear of COVID-19 on social media use (Instagram) and eating disorder behaviors and both internal and external exercise motivation. Moderation analyses were also used to observe the moderating effect of BMI on eating disorder behaviors and both internal and external exercise motivations. Linear regression analyses were used to observe the difference in external and internal exercise motivation for those with high and low levels of eating disorder behaviors.

Statistical Assumptions

Prior to running analyses, statistical assumptions were assessed to ensure that the conclusions drawn were accurate. Skewness and kurtosis were examined to test the normality of the data. The total EDE-Q score had no issues with skewness or kurtosis. For the EMI, Health Pressure was slightly positively skewed (skewness = .85) but had no issues with kurtosis and Ill-health Avoidance had no issues with skewness or kurtosis. Positive Health (skewness = -1.06), Weight Management (skewness = -.66), and Appearance (skewness = -.87) were negatively skewed but had no issues with kurtosis. Fear of COVID-19 was positively skewed (skewness = .88) but had no issues with kurtosis. Perceived Stress had no issues with skewness or kurtosis. (Table 1) There were no significant outliers for any of the measures used and each of the measures used had a somewhat normal distribution. Homogeneity of variance was analyzed for each measure and the results showed that there were no issues with this.

Results

Participants were recruited from the University of North Florida, a southern regional university. The study consisted of 190 participants aged 18 to 45, with 130 of the participants falling in the 18 to 20 range ($n = 66.4\%$). Of the 190 participants, 19 reported their biological sex

at birth as male ($n = 9.9\%$), 169 reported their biological sex at birth as female ($n = 88.9\%$), and two preferred not to say ($n = 1.1\%$). Most of the participants reported their ethnicity as White ($n = 114, 60.0\%$). About half of the participants were categorized in the healthy BMI category ($n = 99, 53.8\%$) and the other half fell into either underweight, overweight, or obese. About half of the participants also reported using Instagram for more than 1 hour daily ($n = 90, 47.4\%$) and the other half reported using Instagram for 1 hour or less than 1 hour daily (Table 2).

Preliminary analyses revealed that BMI was correlated with the total EDE-Q score and perceived stress (Table 3). Total EDE-Q score was also correlated with perceived stress (Table 3). Food security was examined in relation to fear of COVID-19, perceived stress, and EDE-Q score. Analyses revealed that there was no significant difference in fear of COVID-19 for those who are food secure and those who are not (Table 4). However, there was a significant difference in perceived stress for those who are food secure and those who are not (Table 4). Additionally, there was a significant difference in EDE-Q score for those who are food secure and those who are not (Table 4). Ethnicities were categorized into Majority and Minority with Caucasian in Majority ($N = 114$) and the other ethnicities in Minority ($N = 74$). An independent samples t-test was conducted to examine the differences between the two groups. No significant differences between the majority and minority were found for any of the variables tested (Table 5).

Primary Results

Hypothesis 1 examined the difference in fear of COVID-19 for those low and high in social media use. An independent samples t-test revealed that there was no significant difference in fear of COVID-19 between high ($M = 13.08, SD = 6.05$) and low ($M = 13.46, SD = 6.19$) Instagram users, $t(180) = .42, p = .68$ (Table 6). Hypothesis 2 examined the difference in eating disorder behaviors for those low and high in social media use. An independent samples t-test

revealed that there was no significant difference in eating disorder behaviors between high ($M = 2.33$, $SD = 1.53$) and low ($M = 2.22$, $SD = 1.40$) Instagram users, $t(177) = -.51$, $p = .61$) (Table 7). Hypothesis 3 examined the difference in both internal and external exercise motivation for those low and high in social media use. An independent samples t-test revealed that there was no significant difference in internal exercise motivation between high ($M = 7.96$, $SD = 3.17$) and low ($M = 8.74$, $SD = 3.12$) Instagram users, $t(181) = 1.73$, $p = .09$) (Table 7). An independent samples t-test revealed that there was no significant difference in external exercise motivation between high ($M = 6.60$, $SD = 2.73$) and low ($M = 6.61$, $SD = 2.66$) Instagram users, $t(178) = .04$, $p = .97$) (Table 7). Hypothesis 4 examined the effect of fear of COVID-19 as a moderator on the relationship between social media use and eating disorder behaviors. This relationship was tested using Hayes PROCESS Macro model 1. Fear of COVID-19 did not have a significant effect on the relationship between Instagram and eating disorder behaviors, $.01$, 95% CI $[-.06, .08]$ (Figure 1). Hypothesis 5 examined the effect of fear of COVID-19 as a moderator on the relationship between social media use and both external and internal exercise motivation. Fear of COVID-19 did not have a significant effect on the relationship between Instagram use and external exercise motivation, $.02$, 95% CI $[-.11, .15]$ (Figure 2) or internal exercise motivation, $.01$, 95% CI $[-.14, .16]$ (Figure 3).

Secondary Results

Hypothesis 6 examined perceived stress and its relationship with Instagram use. An independent samples t-test revealed that there was no significant difference in perceived stress between high ($M = 9.07$, $SD = 3.34$) and low ($M = 9.01$, $SD = 3.28$) Instagram users, $t(180) = -.115$, $p = .91$) (Table 8). Hypothesis 7 examined the relationship between eating disorder behaviors and exercise motivation. The overall regression for eating disorder behaviors and

internal motivation was not statistically significant ($R^2 = .01$, $F(1, 177) = 2.02$, $p = .16$) (Table 9). Internal motivation was not predicted by eating disorder behaviors. The overall regression for eating disorder behaviors and external motivation was significant, ($R^2 = .13$, $F(1, 174) = 25.70$, $p = .00$) (Table 10). External motivation was predicted by eating disorder behaviors. Hypothesis 8 examined the effect of BMI as a moderator on the relationship between eating disorder behaviors and exercise motivation. This relationship was tested using PROCESS Macro model 1. BMI did have a significant effect on the relationship between eating disorder behaviors and external exercise motivation, $-.05$, 95% CI $[-.09, -.01]$ (Figure 4). As BMI got lower, the relationship between eating disorder behaviors and external exercise motivation got stronger. However, BMI did not have a significant effect on the relationship between eating disorder behaviors and internal exercise motivation, $-.02$, 95% CI $[-.08, .05]$ (Figure 5).

Discussion

Primary Findings

The aim of the current study was to observe how Instagram use during the COVID-19 pandemic affected eating behaviors and exercise motivation. There was no significant difference in fear of COVID-19 between high and low Instagram users. This finding is contradictory with the findings of Ballarotta and colleagues (2021) because their results indicated that higher levels of stress related to COVID-19 was associated with increased Instagram use. This difference between the current study and the study by Ballarotto and colleagues (2021) could be due to the time difference in data collection. COVID-19 regulations in 2022 compared to 2021 are different and this could have influenced the level of stress related to COVID-19 experienced by the population. Furthermore, the type of social media used might have changed since 2020. Meyer and colleagues (2020) determined that the severity of COVID-19 restrictions influenced mental

health. People living in areas with increased COVID-19 restrictions experienced an increase in negative mental health compared to those living in less restrictive areas (Meyer et al., 2020). Furthermore, the difference between the current study and the study by Ballarotto and colleagues (2021) could be related to location because the study was conducted in Italy.

There was no significant difference in EDE-Q score for high and low Instagram users. Vall-Roque and Saldana (2021) determined that increased use of Instagram was associated with body image concerns. The results of the current study may contradict the results of Vall-Roque and Saldana (2021) because of the population studied. The current study focused on a college population in the southeast United States whereas the study by Vall-Roque and Saldana (2021) collected data from a broader age group in Spain. Additionally, participants had only three options to choose from in order to report their social media use. Information about extreme users or different social media apps is unknown. Turner and Lefevre (2017) determined that increased Instagram use was associated with higher symptoms of orthorexia. This was possibly due to the ability to choose what was presented to the user and the higher chance of exposure to food related images (Turner & Lefevre, 2017). If a person were to engage with appearance-focused images or accounts, there could be a higher chance that they also engage in social comparison (Fardouly & Vartanian, 2018). Due to the social distancing measures put into place during the pandemic, people were mainly connected through social media. Furthermore, people in states with stricter COVID-19 policies and quarantine rules could have experienced increased frustration from social comparison (Yue & Xiao, 2022).

There was no significant difference in internal or external exercise motivation for high and low Instagram users. This result is supported by the results of a study conducted by Cohen and Slater (2017). Cohen and Slater (2017) determined that frequency of Instagram use was not

associated with appearance concerns, but rather engagement with appearance-focused images was associated with appearance concerns. Increased use of Instagram may increase the chance of exposure to appearance-focused images, but unless a person is actively engaging with the pictures or accounts, just being exposed to appearance-focused images may not be strong enough to have an effect (Cohen & Slater, 2017). Specifically, during the COVID-19 lockdown, increased use of Instagram did lead to an increase in the following of appearance-focused accounts (Vall-Roque & Saldana, 2021). Vall-Roque and Saldana (2021) suggest that this could be due to the social distancing measures implemented during the pandemic. Furthermore, there was a positive association between Instagram use and body image concerns, and this could possibly increase the risk for engaging in negative eating or exercise behaviors (Vall-Roque & Saldana, 2021).

Fear of COVID-19 did not moderate the relationship between Instagram use and EDE-Q score. This result contradicts previous relationships established between the variables. Ballarotta and colleagues (2021) determined that as COVID-19 stress increases, so does Instagram use. Subsequently, increased Instagram use is associated with increased mental health issues, which can be a precursor to eating disorders (Haidt & Allen, 2020). Vall-Roque and Saldana (2021) determined that as Instagram use increases, so do body image concerns. Specifically, higher Instagram use was associated with higher symptoms of orthorexia (Turner & Lefevre, 2017). The difference between the current study and the other studies can possibly be explained by time of data collected. Furthermore, social media use was measured using a single question. The usage and engagement was not able to be fully examined. Restrictions related to COVID-19 are much different in 2022 than they were in 2020 and 2021. Increased COVID-19 restrictions was associated with poorer mental health in the population (Meyer et al., 2020). Additionally, the

location of data collection could have influenced the results. COVID-19 related restrictions differed country by country. A possible influence on the relationship could be food security. Becker and colleagues (2021) determined that as food insecurity increases, so do symptoms of eating disorders. Specifically, binge eating and compensatory fasting increased for those who were food insecure when the pandemic began (Christensen et al., 2021). Due to the uncertainty of the availability and access to food, a food insecure individual may engage in binge eating when food is present (Rasmusson et al., 2019). Since the risk for developing BED possibly involves cycles of restriction and binging, food insecurity could put an individual at risk for developing BED (Rasmusson et al., 2019).

Fear of COVID-19 did not moderate the strength of the relationship between Instagram use and exercise motivation. As previously stated, increased COVID-19 stress is associated with increased Instagram use (Ballarotta et al., 2021) therefore the results of the current study contradict what is currently known about the relationship between the variables. Furthermore, the lack of COVID-19 restrictions allow people to not rely so heavily on social media to exercise. During the initial COVID-19 lockdown, there was an increase in online searches for at home workouts on Instagram, however by May 2020, the frequency of these searches returned to pre-pandemic levels (Sui & Rhodes, 2022). This decrease in searches could explain why the fear of COVID-19 did not moderate the relationship between Instagram use and exercise motivation. Furthermore, after the pandemic began, people reported exercising for their mental health rather than their physical health (Marashi et al., 2021). The results of the current study are most likely explained by the time of data collection.

Secondary Findings

When looking at how high and low Instagram use affects perceived stress, there was no difference. This result could be explained by the fact that perceived stress seems to be a constant in the college population (Hoyt et al., 2021). Specifically, levels of perceived stress in the college population are increased for minority groups (Hoyt et al., 2021). However, previous research has indicated that increased Instagram use is associated with negative mental health outcomes, specifically anxiety, depression, and stress (Faelens et al., 2021). The time of data collection for the current study might have affected the results. Midterms and finals could have prevented the participants from using Instagram enough for it to influence their mental health. Furthermore, the type of content that the participants engaged with could have influenced the results. People who engaged in social comparison when using Instagram reported higher psychological distress (Marks & Collett, 2020). Since the content that the participants of the current study engaged with are unknown, no conclusions can be drawn about the relationship between Instagram use and perceived stress.

When looking at internal exercise motivation, there was no difference between those high and low in eating disorder symptoms. Conversely, Markland and Ingledew (1997) determined that for participants without an eating disorder, internal motivation was a major motive for exercise. The lack of participants with an eating disorder in the current study could provide a possible explanation for why there was no difference between the two groups. There was a difference in external exercise motivation between those with low and high eating disorder behaviors. Schlegl and colleagues (2018) found similar results. When comparing eating disorder patients and healthy controls, the patients reported external exercise motivations and the healthy controls reported internal exercise motivations (Schlegl et al., 2018). Schlegl and colleagues (2018) also determined that those with an eating disorder primarily exercised for weight or shape

management, but the healthy controls primarily exercised for health reasons. However, the results from a study by Boyd and colleagues (2007) suggest that there is no difference in weight control as a motive for exercise between eating disorder patients and healthy controls. BMI did not moderate the association between EDE-Q score and internal exercise motivation, but it did moderate the association between EDE-Q score and external exercise motivation. Those with a lower BMI had a stronger relationship between EDE-Q score and external exercise motivation. The results of the current study are possibly supported by a study by Bast and colleagues (2015). Bast and colleagues (2015) determined that restrictive eating behaviors increased for those who were externally motivated to exercise. However, Boyd and colleagues (2007) determined that there was no difference in weight management as a motive for exercise for those with and without an eating disorder.

Strengths and Limitations

The current study has a few limitations. Regarding the study's participants, the students involved received credit for psychology classes and this may have influenced their participation. Furthermore, the subject matter of the study could have influenced whether a person chose to participate. The participant pool also consisted of mainly Caucasian females at a southern regional university, and this could have affected the results. One participant was removed due to not answering any of the questions and three participants were removed due to completing the survey in under one minute. Additionally, some of the measures used were in their short form or they were new. Although other studies have used these measures, the lack of use could mean that they are not as reliable as their full form. Specifically, social media use was not determined using a reliable measure. The question asked to determine the use of social media did not capture how

an individual engages with Instagram. Furthermore, the question did not address an extreme use of social media.

Due to the evolving nature of the pandemic, the participant responses are not truly reflective of the emotions experienced at the start of the pandemic. The study captured a moment in time, so the results are reflective of here and now. This leads to the issue of temporal precedence. Data was collected two years after the onset of the pandemic and could not be compared to any data collected prior to the pandemic. Therefore, causal relationship cannot be made with the results of the study. The emergence of new variants could have also caused issues with the participant responses. Furthermore, the guidelines established by the government and each individual state were changing constantly. Florida's response to the pandemic was different from the responses of other states and this is a limitation for the current study because the results cannot be generalized.

Some strengths of the current study are that it looks at a college population and the rates of eating disorders within this population. This population is important to study due to the unique risks that the COVID-19 pandemic poses on college students (Lederer et al., 2020). The current study also observes possible effects of the pandemic on exercise motivation. Prior to the COVID-19 pandemic, college students reported exercising for more mental health reasons rather than physical health reasons (Marashi et al., 2021). Additionally, the results of the current study confirm the results of other studies on food insecurity and its relationship with EDE-Q score.

Implications and Future Directions

Instagram use was not related to fear of COVID-19, EDE-Q score, or exercise motivation and fear of COVID-19 did not moderate the relationship between Instagram use and EDE-Q score or Instagram use and exercise motivation. Although not significant, the results provide

insight into these relationships two years after the onset of the pandemic. The results of the current study provide support for the relationship between perceived stress and food insecurity and backs up previous conclusions that food insecurity is related to symptoms of eating disorders. Overall, the results of the current study imply that the relationships between these variables should be studied further, specifically in the US college population.

Future studies observing the relationship between these variables should use a more diverse sample. Utilizing a more diverse sample can help with the number of participants in each category and help generalize the results. A more diverse sample can allow more differences between the groups to possibly be detected. Understanding how each ethnic group has been affected by the pandemic can aid in implementing strategies to help if necessary. Collecting equal amounts of data from different ethnic groups could help determine if there are any differences between the groups and the different variables in the study. Furthermore, the participants with an eating disorder and without an eating disorder should be equal or close to equal to ensure that the hypotheses can be best analyzed. By ensuring that the eating disorder and non-eating disorder groups are equal, the results can be more representative and generalizable.

Additionally, participants should be recruited from multiple universities to diminish any influence of a specific location. The current university is representative of psychology students from a southern regional university, however gathering data from multiple universities across the United States can help generalize the results and get a more accurate picture of the different relationships. Furthermore, the COVID-19 restrictions put into place in each state since the beginning of the pandemic have varied. These differences can affect how an individual views the pandemic. By collecting data from multiple universities across the United States, any influence of these restriction policies can possibly be mitigated. Additionally, longitudinal studies can help

capture how social media use changes over time. A longitudinal study would also allow for the change in app usage to be observed as well. Future studies should also determine the reasons behind social media use and specifically how long is spent using social media.

Conclusion

The aim of the current study was to determine if the use of Instagram during the COVID-19 pandemic affected eating behaviors and exercise motivation. Although the significant results of the study are sparse, they can still provide some insight. Instagram use did not seem to be related to fear of COVID-19, EDE-Q score, or exercise motivation. However, if data was collected prior to the beginning of the pandemic, a difference in Instagram use could be observed. Fear of COVID-19 did not moderate the relationship between Instagram use and EDE-Q score or Instagram use and exercise motivation. However, this could possibly be due to the number of participants categorized as having an eating disorder. EDE-Q score was related to external exercise motivation, but BMI did not moderate the relationship between EDE-Q score and exercise motivation. Overall, the results of the current study indicate that the pandemic possibly did not affect Instagram use but may have influenced eating behaviors and exercise motivation. Although causal relationships cannot be inferred, the results of the study provide some support for current research on the COVID-19 pandemic.

Tables

Table 1.

Statistical Assumptions

	Mean (<i>SD</i>)	Skewness	Kurtosis	Reliability	Range
EDE-Q Total	2.28 (<i>1.46</i>)	.39	.18	.90	.00-5.70
Health Pressures (Internal)	1.45 (<i>1.29</i>)	.85	-.02	.59	.00-5.00
Ill Health Avoidance (Internal)	3.05 (<i>1.35</i>)	-.20	-.77	.81	.00-5.00
Positive Health (Internal)	3.86 (<i>1.16</i>)	-1.06	.51	.89	.00-5.00
Weight Management (External)	3.27 (<i>1.63</i>)	-.66	-.87	.92	.00-5.00
Appearance (External)	3.33 (<i>1.27</i>)	-.87	.18	.83	.00-5.00
Fear of COVID-19	13.20 (<i>6.06</i>)	.88	.15	.89	7.00-35.00
Perceived Stress	9.06 (<i>3.27</i>)	-.22	-.21	.74	.00-16.00

Table 2.

Demographics

Factor	n	%
Biological Sex		
Male	19	9.9%
Female	169	88.9%
Prefer not to say	2	1.1%
Total	190	

Gender	Male	19	10.0%
	Female	167	87.9%
	Non-binary/third gender	3	1.6%
	Prefer not to answer	1	0.5%
	Total	190	
Age	18-20	130	66.4%
	21-23	46	24.0%
	24-26	7	3.6%
	27-29	1	0.5%
	>= 30	8	4.1%
Ethnicity	White	114	60.0%
	Hispanic or Latino	28	14.7%
	Black or African American	25	13.2%
	Asian/Pacific Islander	13	6.8%
	Other	8	4.2%
Total	190		
BMI	Underweight	13	7.1%
	Healthy	99	53.8%
	Overweight	38	20.7%
	Obese	34	18.5%
	Total	184	
Instagram Use	Less than 1 hour	40	21.1%
	1 hour	54	28.4%
	More than 1 hour	90	47.4%
	Total	184	

Note. Six participants reported not using Instagram and were excluded from the study

Table 3.

Pearson’s Correlations Among Demographics, EDE-Q, EMI-2, Fear of COVID-19, and

Perceived Stress Variables

	1	2	3	4	5	6
1 BMI	-	.30**	.07	.20	.07	.19*
2 EDE Total		-	.10	.64	.01	.39**
3 Internal Motivation			-	.45**	.10	-.09

4 External Motivation	-	.02	.13
5 Fear of COVID-19		-	.07
6 Perceived Stress			-

Note. * $p < .05$, ** $p < .01$

Table 4.

Independent Samples T-Test Between Food Security and Fear of COVID-19, Perceived Stress, and EDE-Q Score

	Food Secure			Food Insecure			df	t	p	Cohen's d
	n	Mean	SD	n	Mean	SD				
Fear of COVID-19	89	12.40	5.98	106	13.60	5.94	172	-1.31	.19	.20
Perceived Stress	68	8.29	3.25	107	9.61	3.25	173	-2.61	.01	.41
EDE-Q	65	2.02	1.48	101	2.56	1.43	164	-2.36	.02	.37

Table 5.

Independent Samples T-Test Between Ethnicity and EDE-Q Score, Internal Motivation, External Motivation, Fear of COVID-19, and Perceived Stress

	Majority			Minority			df	t	p	Cohen's d
	n	Mean	SD	n	Mean	SD				

EDE-Q	106	2.41	1.49	72	2.09	1.41	176	1.48	.44	.22
Internal Motivation	114	8.32	3.02	73	8.44	3.30	185	-2.56	.80	.04
External Motivation	111	3.35	1.27	73	3.32	1.30	182	.70	.48	.02
Fear of COVID-19	112	1.56	2.11	73	1.80	1.85	183	-1.35	.18	.12
Perceived Stress	112	9.04	3.31	74	9.19	3.21	184	-.31	.75	.05

Table 6.

Independent Samples T-Test Between Social Media Use and Fear of COVID-19

	High Use			Low Use			df	t	p	Cohen's d
	n	Mean	SD	n	Mean	SD				
Fear of COVID-19	88	13.08	6.05	94	13.46	6.19	180	.42	.68	.06

Table 7.

Independent Samples T-Test Between Social Media Use and EDE-Q Score, Internal Motivation, and External Motivation

	High Use			Low Use			df	t	p	Cohen's d
	n	Mean	SD	n	Mean	SD				
EDE-Q	88	2.33	1.53	91	2.22	1.40	177	-.51	.61	.08

Internal Motivation	90	7.96	3.17	93	8.74	2.97	181	1.73	.09	.25
External Motivation	88	6.60	2.73	92	6.61	2.66	178	.04	.97	.00

Table 8.

Independent Samples T-Test Between Perceived Stress and Social Media Use

	High Use			Low Use			df	t	p	Cohen's d
	n	Mean	SD	n	Mean	SD				
Perceived Stress	89	9.07	3.43	93	9.01	3.28	180	-.115	.91	.02

Table 9.

Linear Regression of EDE-Q Score and Internal Exercise Motivation

Predictor	Unstandardized Coefficients		Standardized Coefficients		R ²	R ² Change	F	p
	B	SE	B					
EDE-Q	.95	.67	.12		.01	.01	2.02	.16

Table 10.

Linear Regression of EDE-Q Score and External Exercise Motivation

Predictor	Unstandardized Coefficients		Standardized Coefficients	R ²	R ² Change	F	p
	B	SE	B				
EDE-Q	2.78	.55	.34	.13	.13	25.70	.00

Figures

Figure 1.

Moderating Effect of Fear of COVID-19 on Instagram Use and EDE-Q Score

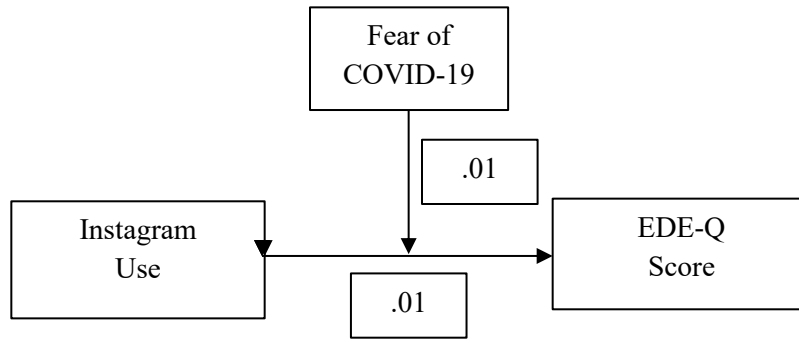


Figure 2.

Moderating Effect of Fear of COVID-19 on Instagram Use and External Motivation

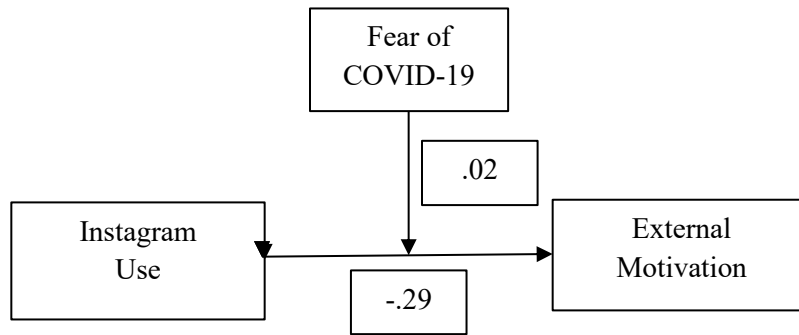


Figure 3.

Moderating Effect of Fear of COVID-19 on Instagram Use and Internal Motivation

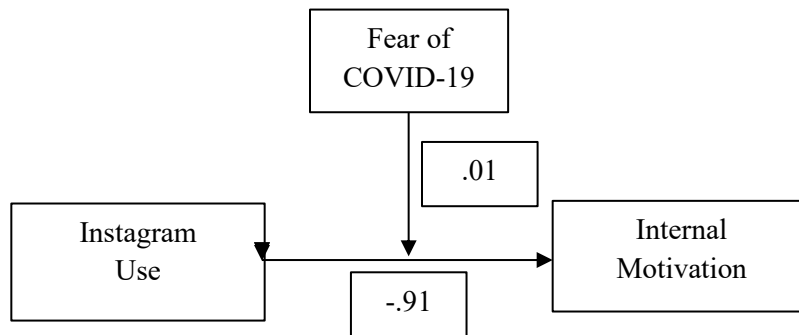
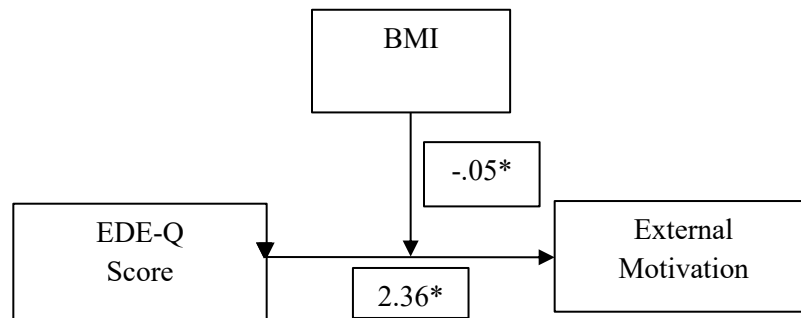


Figure 4.

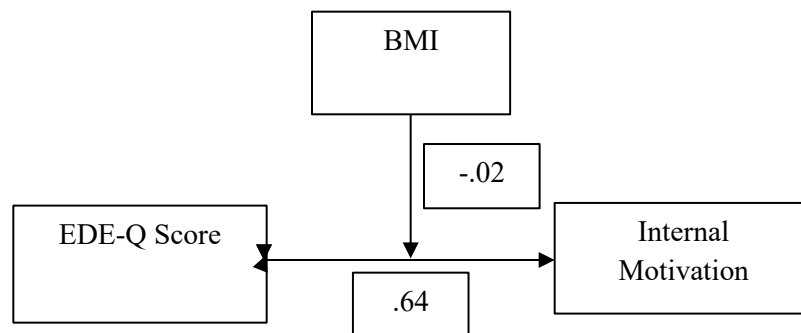
Moderating Effect of BMI on EDE-Q Score and External Motivation



Note. * $p < .05$, *** $p < .001$

Figure 5.

Moderating Effect of BMI on EDE-Q Score and Internal Motivation



Appendix A
Demographics Questionnaire

1. What is your biological sex?

- Male
 Female

2. What is your gender?

- Male
 Female
 Prefer not to answer

3. What is your age?

4. What is your ethnicity?

- White
 Hispanic or Latino
 Black or African American
 Native American or American Indian
 Asian/ Pacific Islander
 Other

5. What is your weight? _____ lbs

6. What is your height? _____ ft _____ in

7. If you use Instagram, how much time do you spend on it during a typical day?

_____ Less than 1 hour

_____ 1 hour

_____ More than 1 hour

_____ I do not use Instagram

Appendix B

Eating Disorder Examination Questionnaire 6.0

Instructions: The following questions are concerned with the past four weeks (28 days) only. Please read each question carefully. Please answer all the questions. Thank you.

Questions 1 to 12: Please circle the appropriate number on the right. Remember that the questions only refer to the past four weeks (28 days) only.

	On how many of the past 28 days.....	No Days	1-5 Days	6-12 Days	13-15 Days	16-22 Days	23-27 Days	Every Day
1	Have you been deliberately <u>trying</u> to limit the amount of food you eat to influence your shape or weight (whether or not you have succeeded)?	0	1	2	3	4	5	6
2	Have you gone for long periods of time (8 waking hours or more) without eating anything at all in order to influence your shape or weight?	0	1	2	3	4	5	6
3	Have you <u>tried</u> to exclude from your diet any foods that you like in order to influence your shape or weight (whether or not you have succeeded)?	0	1	2	3	4	5	6
4	Have you <u>tried</u> to follow definite rules regarding your eating (for example, a calorie limit) in order to influence your shape or weight (whether or not you have succeeded)?	0	1	2	3	4	5	6
5	Have you had a definite desire to have an <u>empty</u> stomach with the aim of influencing your shape or weight?	0	1	2	3	4	5	6
6	Have you had a definite desire to have a <u>totally flat</u> stomach?	0	1	2	3	4	5	6

7	Has thinking about <u>food, eating or calories</u> made it very difficult to concentrate on things you are interested in (for example, working, following a conversation, or reading)?	0	1	2	3	4	5	6
8	Has thinking about <u>shape or weight</u> made it very difficult to concentrate on things you are interested in (for example, working, following a conversation, or reading)?	0	1	2	3	4	5	6
9	Have you had a definite fear of losing control over eating?	0	1	2	3	4	5	6
10	Have you had a definite fear that you might gain weight?	0	1	2	3	4	5	6
11	Have you felt fat?	0	1	2	3	4	5	6
12	Have you had a strong desire to lose weight?	0	1	2	3	4	5	6

Questions 13-18: Please fill in the appropriate number in the boxes on the right. Remember that the questions only refer to the past four weeks (28 days).

Over the past four weeks (28 days)

13	Over the past 28 days, how many <u>times</u> have you eaten what other people would regard as an <u>unusually large amount of food</u> (given the circumstances)?	_____
14On how many of these times did you have a sense of having lost control over your eating (at the time that you were eating)?	_____
15	Over the past 28 days, on how many DAYS have such episodes of overeating occurred (i.e., you have eaten an unusually large amount of food <u>and</u> have had a sense of loss of control at the time)?	_____
16	Over the past 28 days, how many <u>times</u> have you made yourself sick (vomit) as a means of controlling your shape or weight?	_____
17	Over the past 28 days, how many <u>times</u> have you taken laxatives as a means of controlling your shape or weight?	_____

18 Over the past 28 days, how many times have you exercised in a “driven” or “compulsive” way as a means of controlling your weight, shape or amount of fat, or to burn off calories? _____

Questions 19 to 21: Please circle the appropriate number. Please note that for these questions the term “binge eating” means eating what others would regard as an unusually large amount of food for the circumstances, accompanied by a sense of having lost control over eating.

19	Over the past 28 days, on how many days have you eaten in secret (ie, furtively)? Do not count episodes of binge eating	<u>No Days</u> 0	<u>1-5 Days</u> 1	<u>6-12 Days</u> 2	<u>13-15 Days</u> 3	<u>16-22 Days</u> 4	<u>23-27 Days</u> 5	<u>Every Day</u> 6
20	On what proportion of the times that you have eaten have you felt guilty (felt that you've done wrong) because of its effect on your shape or weight? Do not count episodes of binge eating	<u>None of the times</u> 0	<u>A few of the times</u> 1	<u>Less than half</u> 2	<u>Half of the times</u> 3	<u>More than half</u> 4	<u>Most of the time</u> 5	<u>Every time</u> 6
21	Over the past 28 days, how concerned have you been about other people seeing you eat? Do not count episodes of binge eating	Not at all 0	1	Slightly 2	3	Moderately 4	5	Markedly 6

Questions 22 to 28: Please circle the appropriate number on the right. Remember that the questions only refer to the past four weeks (28 days).

Over the past 28 days	Not at all		Slightly		Moderately		Markedly
-----------------------------	------------	--	----------	--	------------	--	----------

22	Has your <u>weight</u> influenced how you think about (judge) yourself as a person?	0	1	2	3	4	5	6
23	Has your <u>shape</u> influenced how you think about (judge) yourself as a person?	0	1	2	3	4	5	6
24	How much would it have upset you if you had been asked to weigh yourself once a week (no more, or less, often) for the next four weeks?	0	1	2	3	4	5	6
25	How dissatisfied have you been with your <u>weight</u> ?	0	1	2	3	4	5	6
26	How dissatisfied have you been with your <u>shape</u> ?	0	1	2	3	4	5	6
27	How uncomfortable have you felt seeing your body (for example, seeing your shape in the mirror, in a shop window reflection, while undressing or taking a bath or shower)?	0	1	2	3	4	5	6
28	How uncomfortable have you felt about others seeing your shape or figure (for example, in communal changing rooms, when swimming, or wearing tight clothes)?	0	1	2	3	4	5	6

Appendix C

Exercise Motivation Inventory 2

		Not at all true for me				Very true for me	
	Personally, I exercise (or might exercise)	0	1	2	3	4	5
1	To stay slim	0	1	2	3	4	5
2	To avoid ill-health	0	1	2	3	4	5
3	Because it makes me feel good	0	1	2	3	4	5
4	To help me look younger	0	1	2	3	4	5
5	To show my worth to others	0	1	2	3	4	5
6	To give me space to think	0	1	2	3	4	5
7	To have a healthy body	0	1	2	3	4	5
8	To build up my strength	0	1	2	3	4	5
9	Because I enjoy the feeling of exerting myself	0	1	2	3	4	5
10	To spend time with friends	0	1	2	3	4	5

		Not at all true for me				Very true for me	
	Personally, I exercise (or might exercise)	0	1	2	3	4	5
11	Because my doctor advised me to exercise	0	1	2	3	4	5
12	Because I like trying to win in physical activities	0	1	2	3	4	5
13	To stay/become more agile	0	1	2	3	4	5
14	To give me goals to work towards	0	1	2	3	4	5
15	To lose weight	0	1	2	3	4	5

16	To prevent health problems	0	1	2	3	4	5
17	Because I find exercise invigorating	0	1	2	3	4	5
18	To have a good body	0	1	2	3	4	5
19	To compare my abilities with other peoples'	0	1	2	3	4	5
20	Because it helps to reduce tension	0	1	2	3	4	5

		Not at all true for me	Very true for me				
	Personally, I exercise (or might exercise)	0	1	2	3	4	5
21	Because I want to maintain good health	0	1	2	3	4	5
22	To increase my endurance	0	1	2	3	4	5
23	Because I find exercising satisfying in and of itself	0	1	2	3	4	5
24	To enjoy the social aspects of exercising	0	1	2	3	4	5
25	To help prevent an illness that runs in my family	0	1	2	3	4	5
26	Because I enjoy competing	0	1	2	3	4	5
27	To maintain flexibility	0	1	2	3	4	5
28	To give me personal challenges to face	0	1	2	3	4	5
29	To help control my weight	0	1	2	3	4	5
30	To avoid heart disease	0	1	2	3	4	5

		Not at all true for me	Very true for me				
	Personally, I exercise (or might exercise)	0	1	2	3	4	5
31	To recharge my batteries	0	1	2	3	4	5
32	To improve my appearance	0	1	2	3	4	5

33	To gain recognition for my accomplishments	0	1	2	3	4	5
34	To help manage stress	0	1	2	3	4	5
35	To feel more healthy	0	1	2	3	4	5
36	To get stronger	0	1	2	3	4	5
37	For enjoyment of the experience of exercising	0	1	2	3	4	5
38	To have fun being active with other people	0	1	2	3	4	5
39	To help recover from an illness/injury	0	1	2	3	4	5
40	Because I enjoy physical competition	0	1	2	3	4	5

		Not at all true for me	Very true for me				
	Personally, I exercise (or might exercise)	0	1	2	3	4	5
41	To stay/become flexible	0	1	2	3	4	5
42	To develop personal skills	0	1	2	3	4	5
43	Because exercise helps me to burn calories	0	1	2	3	4	5
44	To look more attractive	0	1	2	3	4	5
45	To accomplish things that others are incapable of	0	1	2	3	4	5
46	To release tension	0	1	2	3	4	5
47	To develop my muscles	0	1	2	3	4	5
48	Because I feel at my best when exercising	0	1	2	3	4	5
49	To make new friends	0	1	2	3	4	5
50	Because I find physical activities fun, especially when competition is involved	0	1	2	3	4	5
51	To measure myself against personal standards	0	1	2	3	4	5

Appendix D
Fear of COVID-19

		Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1.	I am most afraid of coronavirus-19.	1	2	3	4	5
2.	It makes me uncomfortable to think about coronavirus-19.	1	2	3	4	5
3.	My hands become clammy when I think about coronavirus-19.	1	2	3	4	5
4.	I am afraid of losing my life because of coronavirus-19.	1	2	3	4	5
5.	When watching news and stories about coronavirus-19 on social media, I become nervous or anxious.	1	2	3	4	5
6.	I cannot sleep because I'm worrying about getting coronavirus-19.	1	2	3	4	5
7.	My heart races or palpitates when I think about getting coronavirus-19.	1	2	3	4	5

Appendix E

Food Insecurity

Select the appropriate fill from parenthetical choices depending on the number of persons and number of adults in the household.

1. The food that I bought just didn't last, and I didn't have money to get more. Was that often, sometimes, or never true for you in the last 12 months?

- Often true
 Sometimes true
 Never true
 DK or Refused

0. I couldn't afford to eat balanced meals. Was that often, sometimes, or never true for you in the last 12 months?

- Often true
 Sometimes true
 Never true
 DK or Refused

Appendix F

Perceived Stress Scale 4

	Never (0)	Almost Never (1)	Sometimes (2)	Fairly Often (3)	Very Often (4)
In the last month, how often have you felt that you were unable to control the important things in your life?					
In the last month, how often have you felt confident about your ability to handle your personal problems?					
In the last month, how often have you felt that things were going your way?					
In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?					

Appendix G

Informed Consent

SUBJECT CONSENT FORM FOR PARTICIPATION IN HUMAN RESEARCH AT UNIVERSITY OF NORTH FLORIDA

PROJECT TITLE: The Effect of the COVID-19 Pandemic on how Social Media Use Influences Eating Disorders and Exercise Frequency

Hi, my name is Abhilasha Kumar and I am a graduate student at the University of North Florida.

PURPOSE OF THE RESEARCH STUDY: The purpose of this research study is to observe the effect of social media use during the COVID-19 pandemic on both eating disorders and exercise. You will be asked to complete a survey and provide demographic information about yourself.

PROCEDURES INVOLVED: We will ask you to complete an online questionnaire and provide information about your Instagram use, COVID-19 related fears, eating behaviors, exercise behaviors, and food security status. We expect that participation in this study will take about 30-40 minutes of your time.

RISKS AND BENEFITS: There are no direct benefits to taking part in this study, but others may benefit from the information we learn from the results of this study. There is minimal risk for taking part in this research study. If you experience emotional discomfort, please refer to the UNF Counseling Center. The Counseling Center is available to schedule appointments at <https://www.unf.edu/counseling-center/> or (904) 620-2602. Furthermore, for Psychology students, in exchange for participation you will receive partial course credit on SONA.

VOLUNTARY PARTICIPATION: Your participation in this research is completely voluntary. There is no penalty for not participating. You may choose not to participate in this research without negatively impacting your relationship with UNF or Dr. Witherspoon.

RIGHT TO WITHDRAW FROM STUDY: You have the right to withdraw from the study anytime without consequence.

CONFIDENTIALITY: You will not be asked to provide any personally identifiable information in this internet-based survey. Your responses will be anonymous. Only authorized personnel will have access to your responses and the data will be stored on password protected computers and servers in locked rooms.

WHOM TO CONTACT IF YOU HAVE QUESTIONS ABOUT THE STUDY: If you have any questions or concerns about this project, please contact me at n01469540@unf.edu or Dr. Dawn Witherspoon at d.witherspoon@unf.edu. If you have questions about your rights as a research participant or if you would like to contact someone about a research-related injury,

please contact the chair of the UNF Institutional Review board by calling (904) 620-2498 or emailing irb@unf.edu.

We suggest that you print out a copy of this consent form for your records. Only individuals who are at least 18 years old are eligible to participate in this research.

Clicking “I agree” below indicates that you have read and understand the information provided above, that you willingly agree to participate, that you are aware that you may withdraw your consent at any time, skip any items you wish, discontinue participation without penalty, and that you know you may print a copy of this form. Clicking “I do not agree” will terminate the study session.

I Agree

I Do Not Agree

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