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Worse exercise habits and diminished body image perception in college students,
is COVID-19 to blame?

A Thesis Submitted to
The Faculty of the University of North Georgia
In Partial Fulfillment
Of the Requirements for the Degree
Bachelor of Science in Kinesiology
With Honors

L Jeanette Anderson

Spring 2022

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Definitions

- All-cause mortality: Death by any cause
- Body Dysmorphia Disorder (BDD): Derived from a Greek word meaning “obsessions of shame of the body”, BDD is a psychiatric condition described as a preoccupation and obsession with a perceived imperfection in an individual’s own physical appearance that others likely would not notice.
- Body image: An individual’s opinions concerning their own physical body, including its appearance, shape, and size
- Comorbidity: Occurrence of more than one illness or disease in an individual at a single point in time
- Coronavirus (COVID-19): Illness caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) microorganism that resulted in a worldwide pandemic in the early 21st century
- Cross-sectional research: Research method that allows a researcher to view a population at a specific point in time
- The Diagnostic and Statistical Manual of Mental Disorders (DSM): Manual created by the American Psychiatric Association to be used as a tool to assess and diagnose mental disorders
- Exercise pre-conditioning: Bodily adaptation of a protective phenotype in both cardiac and skeletal muscle fibers due to endurance exercise training
- Negative body image: Body image perception whose predictors include body dissatisfaction, a drive for thinness, thin ideal internalization, overweight preoccupation, and body shame

- Physical activity (PA): Movement of the body that requires energy expenditure
- Physical inactivity: Lack of expending energy through movement
- Positive body image: Body image perception, which is multifaceted in nature, holistic, and shaped by social identities
- Voluntary response convenience sampling: Method of research sampling in which the population of interest is both efficient and more easily accessible to the researcher

Introduction

Early reports suggested that the public health safety measures associated with the coronavirus (COVID-19) pandemic (e.g.: social distancing and stay-at-home orders) were creating negative consequences on individuals' physical and mental health (Huckins et al., 2020; Salazar de Pablo et al., 2020). Huckins et al. (2020) found that some negative consequences may include more sedentary behaviors and increased symptoms of depression and anxiety, specifically among college students. Substantial evidence exists to support the benefit of regular physical activity (PA) and exercise on all aspects of physical, mental, and emotional health (Biddle, 2016; Fletcher et al., 2018). Healthcare experts may argue that a worldwide pandemic has the potential to disrupt this harmonious connection between PA and all aspects of health.

Coronavirus is caused by a severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the causal microorganism for the illness (Ita, 2021; Kirtipal et al., 2020). In comparison with influenza viruses, COVID-19 is both more susceptible and transmissible in certain populations of people (Centers for Disease Control and Prevention, 2022). Though both viruses have similar symptoms, the risks associated with the rapid spread of COVID-19 has been viewed to be potentially more detrimental. This leads to the implementation of numerous public health pre-cautionary measures during the pandemic.

The current guidelines for PA are defined by the United States Department of Health and Human Services (HHS) resource. These guidelines recommend a minimum of 150 to 300 minutes a week of moderate-intensity aerobic PA or 75 to 150 minutes a week of vigorous-intensity aerobic PA (Piercy et al., 2018). Examples of moderate-intensity

exercise may include brisk walking, playing doubles tennis, or doing yardwork while vigorous-intensity may include jogging, walking stairs, or participating in a strenuous fitness class (Piercy et al., 2018). An alternative option to fulfill these recommendations would consist of an equivalent combination of moderate- and vigorous-intensity aerobic PA for apparently healthy adults (Piercy et al., 2018). Piercy et al (2018) provided a plethora of information regarding the positive effects that participation in PA has for the individual (Piercy et al., 2018). The proposed positive benefits for adults who follow these recommendations include improved sleep, cognition, bone health, physical function, a reduced risk of all-cause mortality (i.e., death from any cause), and a reduced risk for a plethora of chronic diseases (Piercy et al., 2018). Chronic diseases including cardiovascular disease, type 2 diabetes, hypertension, certain cancers, and dementia have been shown to place an additional burden on the healthcare system and the intervention of PA has been shown to be an effective countermeasure (Piercy et al., 2018). This sentiment was echoed by Ding et al., (2016) who conducted a study estimating the healthcare costs of physical inactivity to be \$53.8 billion globally in 2013. This highlighted the importance of PA as a method for preventing several chronic diseases and thus, reduce healthcare costs. Even with a sound body of empirical evidence and universally adopted public health efforts, there still has been a reported high prevalence of physical inactivity worldwide (Ding et al., 2016; Haileamlak, 2019).

The COVID-19 pandemic has greatly impacted societal, personal, and communal norms across the globe. In the face of such unprecedented times, the normal day-to-day operations of private and corporate businesses have been disrupted and forced to evolve. During the Spring 2020 academic year, universities made the abrupt shift to online

instruction and college campuses were shut down in an attempt to minimize the spread of COVID-19 and to flatten the curve (Kornbluh, 2020). When university classes switched to online instruction due to COVID-19 precautions and restrictions, recreation centers drastically changed operational hours or were required to completely shut down. This possibly had an unintended side effect and further impacted post-secondary student levels of PA that solely related on these facilities (NIRSA, 2020). As a student at the University of North Georgia (UNG), I personally experienced a drastic shift in my own PA participation. While my own participation in PA has since returned to the recommended level, I believe these countermeasures impacted my own physical, mental, and emotional health.

Shang et al. (2021) showed a significant positive correlation ($p < 0.001$) between PA and body image among individuals. This correlation encourages consideration of the impact COVID-19 had on body image among college students during the pandemic. Body image has been historically defined as an individual's perceptions or feeling towards their own physical body, including its appearance, shape, and size (Miranda et al., 2018). Knowing that a reduction in PA participation may impact an individual's body image perceptions, highlights the importance of having easily accessible and affordable fitness facilities on college campuses to assist in combating negative body image perceptions. One of the primary fees UNG post-secondary students pay is to fund and maintain a modern and functional student recreational center.

With several drastic changes in everyday life throughout the COVID-19 pandemic, this Thesis reviewed the potential impact that COVID-19 had on college students PA as well as the impact that reduced PA had on body image. Moreover, this Thesis assessed

whether COVID-19 had an influence on worsening body image among college students since students lost direct access to the university student recreation center and equipment when universities implemented additional restrictions and safeguard measures during periods of COVID-19 related lockdowns.

Physical Activity and COVID-19

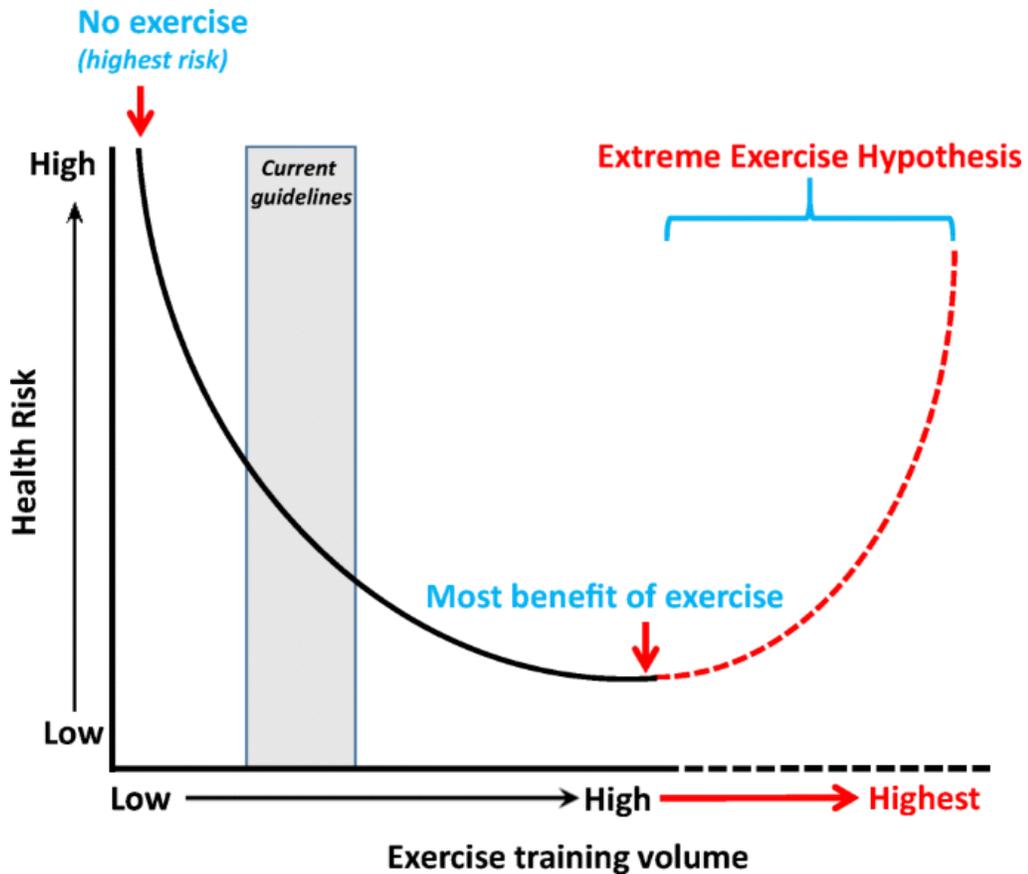
The Centers for Disease Control and Prevention (CDC; n.d.) established recommendations to prevent the spread of COVID-19 including stay-at-home orders, social distancing, closure of parks, gymnasiums, and recreational fitness centers. An unintended side-effect of the implementation of these safety measures may have decreased PA participation among individuals who were reliant on these facilities. This trickling effect may have proved to be detrimental due to the knowledge of a direct correlation between PA, disease prevention, and quality of life (Haskell et al., 2007).

Often, there are comorbidities that need to be considered when accounting for prevalent diseases within unique patient populations that may require support from health centers. Comorbidities are defined as the occurrence of more than one illness or disease in an individual at one time (Merriam-Webster, n.d.). The comorbidity rate seen with COVID-19 cases are also commonly associated with chronic illnesses, which may be prevented by living a healthy lifestyle according to the current guidelines and recommendations (Piercy et al., 2018; Siordia, 2020). The most common comorbidity noted within COVID-19 cases is hypertension (30.7%) followed by diabetes mellitus (14.3%) and cardiovascular diseases (11.9%), all of which can be alleviated by living a healthy lifestyle (Siordia, 2020).

The importance of following PA guidelines needs to be prioritized when participating in PA due to the hypothesis of a U-shaped relationship between PA and resistance to disease, as seen Figure 1 below (Eijsvogels et al., 2018). This hypothesis states that regular, moderate doses of PA have proven beneficial to overall health, while excessive amounts or intensities of PA may have negative consequences for immune function (Walsh et al., 2011). Moderate intensity exercise itself has proven to increase immune function and may potentially reduce the risk and severity of respiratory viral infections (Martin et al., 2009).

Figure 1

Hypothesis of a U-shaped Relationship Between PA and Resistance to Disease



Furthermore, there is evidence that many organ systems in the body undergo adaptations because of endurance exercise training, a term often coined exercise pre-conditioning (Powers et al., 2020). This term has been used to describe the adaptation of a protective phenotype in both cardiac and skeletal muscle fibers because of endurance exercise training, specifically highlighting its usefulness in prevention of inactivity-induced muscle atrophy (Powers et al., 2020; Woods et al., 2020). Analogously, Morton et al. (2019) found that exercise-induced changes in an enzyme found in the diaphragm muscle are essential to achieve the benefits of exercise-induced protections, specifically against ventilator-induced diaphragm dysfunction. Consequently, endurance athletes who contracted COVID-19 and required ventilator support as a result were predicted to benefit from the exercise pre-conditioning of the diaphragm muscles. While the population surveyed in this thesis was not solely restricted to endurance athletes, this is to simply note the body's overall unique adaptive responses to endurance training. Lastly, the consequences of COVID-19 related to social isolation on PA inversely impacted the global burden of cardiovascular disease (Peçanha et al., 2020; Piercy et al., 2018). As self-evident as it seems, PA and an overall healthy lifestyle can potentially reduce the risk and severity of COVID-19.

Impact of Fitness Center Limitations on Physical Activity

The COVID-19 pandemic caused gym and fitness center closures across the country, including most college campuses, making it important to acknowledge the impact that the lack of gym availability may have had on students (NIRSA, 2020). As fitness centers began to reopen, they did so at a limited capacity and additional safety procedures were required to be followed while allowing for indoor PA. The most

prevalent and heavily debated procedures recommended by the CDC included regulations on mask-wearing among individuals, especially while indoors and sanitizing equipment after a single usage (Centers for Disease Control and Prevention, 2021). This may have potentially influenced people's willingness to engage in PA at these facilities due to the additional stress caused or conflicting work schedules during new operational hours. Financial concerns may have also impacted PA participation, since surveys confirmed that many Americans remained worried about financially meeting their basic needs even a year into the pandemic (Horowitz et al., 2021). Gym capacity limits, which ensured social distancing guidelines, along with indoor mask mandated policies and financial factors, may have compelled fewer individuals to attend fitness centers.

Pre-cautionary measures taken during the pandemic may have also impacted the dietary intake of those involved. Gallo et al. (2020) surveyed PA and diet in third-year biomedical students at a university in Australia and found that about 30% fewer students of both sexes achieved what would be considered sufficient levels of PA during the pandemic, compared to students that were enrolled in the same course two years prior. This study also found that females' energy intake was about 20% greater during the pandemic, likely due to an increase in energy density of foods during mealtime as well as snacking frequency (Gallo et al., 2020). Further into the pandemic during the summer of 2020, where gradual reductions of nationwide COVID-19 restrictions were underway, there was a follow-up study conducted six to eight weeks after the initial study; this supplemental study found that their initial findings had persisted in regards to the increased energy intake (Gallo et al., 2020). Data from this study established a cause for

concern based upon the significant health impact that COVID-19 isolation measures have on long-term diet and PA participation.

Body Image and COVID-19

Traditionally, body image research has been focused on defining negative body image and its predictors rather than focusing on positive body image. The main predictors of negative body image include body dissatisfaction, a drive for thinness, thin ideal internalization, overweight preoccupation, and body shame, which establish the connection between negative body image and disordered eating (Neumark-Sztainer, 2018). More recently, research has corrected this focus on negative body image, with a shifted focus to positive body image. Research on positive body image has emerged and flourished in the past decade and is defined as being distinct from negative body image, multifaceted in nature, holistic, and shaped by social identities (Tylka & Wood-Barcalow, 2015A). Some of these facets may include body appreciation, body acceptance/love, a conceptual definition of beauty, and inner positivity among other aspects (Tylka & Wood-Barcalow, 2015A).

Though there is some overlap, negative body image perceptions are not to be confused with body dysmorphic disorder (BDD). The Diagnostic and Statistical Manual of Mental Disorders (DSM) by the American Psychiatric Association offers a current standard definition and classification of BDD in the DSM-5 edition, though it first became a psychiatric diagnosis in the DSM-3-R of 1987 (*History of BDD*, n.d). Nicewicz & Boutrouille (2021) have labeled BDD as a psychiatric condition described as a preoccupation and obsession with a perceived imperfection in an individual's own physical appearance that others likely would not notice. The term for BDD was derived

from the Greek word “dysmorphophobia”, which may be identified as a person’s “obsessions of shame of the body” (Nicewicz & Boutrouille, 2021, p. 2). Since perceptions of negative body image is based solely on an individual’s feelings, rather than a psychiatric condition, it does not need to be clinically diagnosed for assessment. Conversely, BDD is diagnosed under the DSM-5 and is used by mental health professions in the United States to classify mental health disorders (American Psychiatric Association, 2013). For purposes of this thesis, we are not attempting to determine or diagnose BDD in our participants, but rather assess altered body image perceptions.

Stay-at-home orders had excessive influence not only on individuals’ participation in PA, but also on food accessibility throughout the day. While body appreciation is considered one of the primary components of a positive body image, and arguably the most important, it has been defined as accepting, respecting, and holding favorable opinions for the body, while also rejecting media-promoted appearance standards as the lone criterion of human beauty (Tylka & Wood-Barcalow, 2015B). Baceviciene and Jankauskiene (2020) conducted a survey on body appreciation and disordered eating among adolescents finding that higher body appreciation is associated with significantly lower levels of disordered eating in both genders. In fact, body appreciation paired with body functionality and self-esteem were the strongest predictors of lower disordered eating (Baceviciene & Jankauskiene, 2020). Consequently, lockdowns and quarantine associated with COVID-19 might have significantly impacted individual eating habits and consequently their body image. Additionally, this may go hand in hand with the impact that social isolation had on exercise behaviors, since we

know that there is a significant correlation between exercise and well-being relating to body image and body satisfaction (Shang et al., 2021).

Summary

The importance of PA is deeply recognized in both research and public health in the US today. Current research presents a significant positive correlation between PA and body image perceptions (Shang et al., 2021), highlighting the need to explore the impact that COVID-19 has had on each. This thesis explored the possible impact that COVID-19 had on body image perceptions among college students considering the predicted decrease in PA participation among the population due to COVID.

Methodology

Study Design

A descriptive cross-sectional survey was distributed during the spring 2022 academic semester. The population of interest was currently enrolled college students associated with a campus where the primary researcher was completing their own post-secondary education. Cross-sectional research is fundamentally a way to view a population at a specific point in time, as defined by the time the survey was taken (Kesmodel, 2018). Attributable to the nature of cross-sectional research, some limitations include an inability to determine a true cause and effect relationship among the factors involved and the research timing is not guaranteed to be representative. This Thesis was able to focus on the prevalence of attitudes and health behaviors to describe this population at that moment in time due to being precisely a descriptive type of cross-sectional survey (Kesmodel, 2018). This type of research is a great option for assessing the prevalence of disease, traits, knowledge, or even personal attitudes (Kesmodel, 2018).

The survey used voluntary response convenience sampling. This method of sampling a population was both efficient and more easily accessible to the researcher given the unique nature/demands of the Honor's Thesis (Andrade, 2021). To engage the student body at UNG, department Heads were asked to present a QR code to classes if willing and able. In addition to this, there were flyers posted around campus with QR code access.

Research Questions

The researcher crafted the following research questions to guide the development of a unique survey instrument and to gain a greater appreciation into the proposed topic.

- i. How did the limited access to fitness facilities and equipment during the COVID-19 pandemic influence PA participation among college students?
- ii. Did the impact on college students' PA during the COVID-19 pandemic subsequently influence their body image perceptions?

Setting

The University of North Georgia is a Senior Military College associated with the University System of Georgia (USG). There are five physical campuses including Dahlonega, Gainesville, Cumming, Oconee, and Blue Ridge. The campus included in this specific study was primarily UNG's Dahlonega campus, which is also the university's largest campus. In Fall of 2021, the UNG Institutional Effectiveness office collected data about the students at the time that the data in this study were collected (University of North Georgia, 2021). The office reported 19,427 enrolled students. Of these, 8,201 (42%) students were male and 11,221 were female (58%). There were 4,228 (22%) enrolled at the Associate's degree level, 14,345 (74%) at the Bachelor's level, and 854

(4%) at the Graduate level. There were 12,418 (64%) students enrolled full-time and 7,009 (36%) enrolled part-time.

Subjects and Sampling

The subjects for this study were students from UNG and part of a voluntary response convenience sample due to the proximity to the researcher (Setia, 2016). This sampling helped to achieve a higher recruitment and response rate thanks to the easier accessibility. The researcher also attended the UNG campus in Dahlonega, which was the primary campus assessed in this survey and the only campus with flyers physically displayed. For the study to have a 95% confidence interval with a 10% margin of error, the researcher needed at least 96 responses (Raosoft, Inc., n.d.). Although the students at UNG may not be a true representation of all college students in the U.S., or even in Georgia, the study revealed information about this specific body of university students in North Georgia. Participation in this study was voluntary, and each participant remained anonymous.

Exclusion Criteria

Subjects that were excluded from the study were UNG faculty and staff, students from other universities, UNG students who were under the age of 18 at the time of survey distribution and/or students who were not actively enrolled in courses affiliated with a UNG campus during the Spring 2022 semester.

Inclusion Criteria

To be included in this study, the participants had to be over the age of 18 and currently enrolled in courses at UNG during the Spring 2022 semester. An informed consent disclaimer was included within the cover page of the survey. Participants were

informed of the nature of the study and acknowledged their willingness to participate prior to being granted access to the survey instrument. During the survey, participants that did not meet all inclusion criteria were automatically redirected from the survey to a thank you message.

Instrumentation

The researcher created the Anderson Pandemic-Related Impacts Survey with guidance from the thesis chair, which was distributed to subjects electronically through Qualtrics; Appendix A. The survey evaluated changes in PA participation and body image perceptions as compared to what it may have been prior to the COVID-19 pandemic. After pilot testing the survey to determine the relative length of time it may take, the participants were notified that the survey would take approximately 5 minutes to complete. An introduction page was included to explain the purpose of this study and to serve as an informed consent for all participants before directly granting access to the Anderson Pandemic-Related Impacts Survey.

Demographics

The following demographic questions were developed for the survey. The first question ensured that the participant was a currently enrolled student at UNG. If the participant answered no, they were directed to the end of the survey because they did not fit into the inclusion criteria. The next question examined for gender demographics, followed by question 3 inquiring the participant for their age range. If they were under the age of 18 years old, they were redirected to the end of the survey. The fourth question asked for the participants to identify which post-secondary status category they fit into, followed by question 5 inquiring of which post-secondary experience level was

appropriate according to the participant's acquired course hours. Question 6 asked which campus the participant completed the majority of coursework on. Finally, the last demographic question and seventh thus far, examined which college at UNG the participant's declared major was housed under.

The Anderson Pandemic-Related Impacts Survey

Questions 8, 9, and 10, each provided six ranges (e.g.: 0-200+ minutes a week) for the participant to gauge their PA levels before and directly after COVID-19 began, and then their current PA level. Question 11 asked if the participant agreed with the statement provided on whether they modified their PA during COVID-19 related lockdown. If the participant answered yes, the survey branched off to question 12 asking which style of PA they participated in that was different than before COVID-19. Question 13 ensured that the participant was an enrolled university student during COVID-19 precautionary measures (e.g.: mandatory mask mandates, public capacity limits, etc). If their answer was yes, they were given question 14 with a 5-point Likert scale to assess how they felt about university recreational fee charges during COVID-19 limitations. The last three questions transitioned into evaluating the participant's body image perceptions. Question 15 asked if the participant felt that their body image perceptions changed because of COVID-19. If the participant answered no, the survey was terminated, and they were redirected to a thank you message. If they answered yes to question 15, the survey directed them to question 16 which offered a 5-point Likert scale assessing if they agreed that COVID-19 negatively impacted their body image perception. The final question then requested the participant to choose all options that

may have resulted in the negative impact on their body image perception. After question 17 the survey was terminated, and the participant was redirected to a thank you message.

Procedures

The study was evaluated by the UNG Institutional Review Board (IRB) which obtained an exempt designation; Appendix B. Upon obtaining IRB exempt designated approval, the survey was electronically distributed through Qualtrics (i.e., an electronic survey software) once a participant opened the QR code accessed through the recruitment flyer; Appendix C. The researcher contacted college Deans and Department Heads across the Dahlonega and Gainesville campuses requesting that they send the survey to faculty in their department across any UNG campus. If faculty were willing and able to display the survey, they either displayed a QR code to the survey during class or sent out an email to their respective class email lists. Recruitment flyers were also posted across the Dahlonega campus which displayed the same QR code, directing students to the survey. The survey remained open for a total of four weeks. Participants were informed that they were voluntarily consenting to participate in a survey and were required to do so in order to be granted access to the survey. Participants were also informed that they could stop the survey at any time without penalty as part of the initial disclaimer on the first page of the survey.

Results

The descriptive cross-sectional survey was conducted to determine the extent of impact the COVID-19 pandemic had on college students' PA and how this change may have impacted students' respective body image perceptions. This study took place for four weeks between January and February of 2022. After the data were checked for

incomplete responses and the responses were numerically coded, the data were analyzed using SPSS Statistics 26.0. Within this section, the results of the survey are presented.

Description of the Sample

This survey was emailed to department Heads and Deans across UNG with the request to be forwarded out to students and other professors if willing and able. There were also flyers posted across the Dahlonega campus with anonymous QR code access linked. There were 105 responses to the survey, and of the total responses, 97 indicated that they were a currently enrolled student at UNG, but the remaining 8 responses were incomplete. The following description of the sample will focus on the 97 participants that finished the survey in its entirety and were currently enrolled students at UNG during this time; Table 1.

Table 1*Participant demographics based on survey responses to questions 1-7.*

Variable	Item	n=	Percent
Gender	Female	75	77.3
	Male	18	18.6
	Other/Missing value	2	2
Age	18-21 years	78	80.4
	22-23 years	12	12.4
	24-25 years	2	2.1
	26+ years	4	4.1
	Missing	1	1
Post-secondary student status	Associate's	4	4.1
	Bachelor's	88	90.7
	Doctorate	1	1
	Not listed	2	2.1
	Missing	2	2.1
Post-secondary experience level	First year	17	17.5
	Second year	20	20.6
	Third year	32	33
	Fourth year	14	14.4
	Fifth year	11	11.3
	Not listed	1	1
Primary campus	Dahlonaga	79	81.4
	Gainesville	13	13.4
	Oconee	3	3.1
	Missing	2	2.1
Specific UNG college	Health Sciences	44	45.4
	Science & Math	17	17.5
	Education	13	13.4
	Business	6	6.2
	Arts & Letters	4	4.1
	Missing	13	13.4

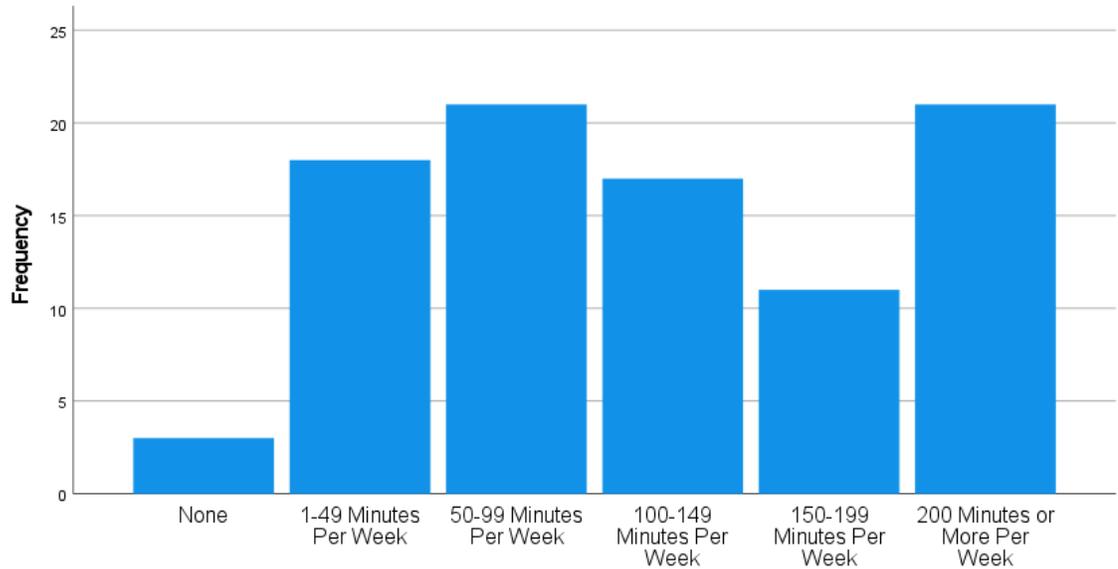
The survey included several demographic questions to provide more information about the participants involved. Most of the sample was female (n=75), between the ages of 18 and 21 years (n=78), and pursuing their Bachelor's degree (n=88) on the Dahlonega campus (n=79). Nearly half of participants' major was housed under the College of Health Sciences and Professions (n=44). Their post-secondary experience levels varied.

Physical Activity Participation

The following questions in the survey were created to answer the first research question, how did the limited access to fitness facilities and equipment during the COVID-19 pandemic influence PA participation among college students? The next three questions assess if there was a change in PA participation levels before COVID-19, during the time directly after the start of COVID-19, and currently in the beginning of 2022 and can be seen in Figures 2-4. Question 8 asked participants to indicate their level of PA per week before the start of the COVID-19 pandemic. The responses can be seen in figure 2 below. Of those responses, 18.6% participated in 1-49 minutes of PA per week (n=18), 21.6% chose 50-99 minutes (n=21), 17.5% chose 100-149 minutes (n=17), 11.3% chose 150-199 minutes (n=11), and 21.6% chose 200 or more minutes per week (n=21). Besides the 6.2% of missing responses (n=6), the remaining 3.1% indicated they participated in no PA before COVID-19 (n=3).

Figure 2

Frequency of Responses to Question 8 Indicating Levels of Participants' PA Before COVID-19

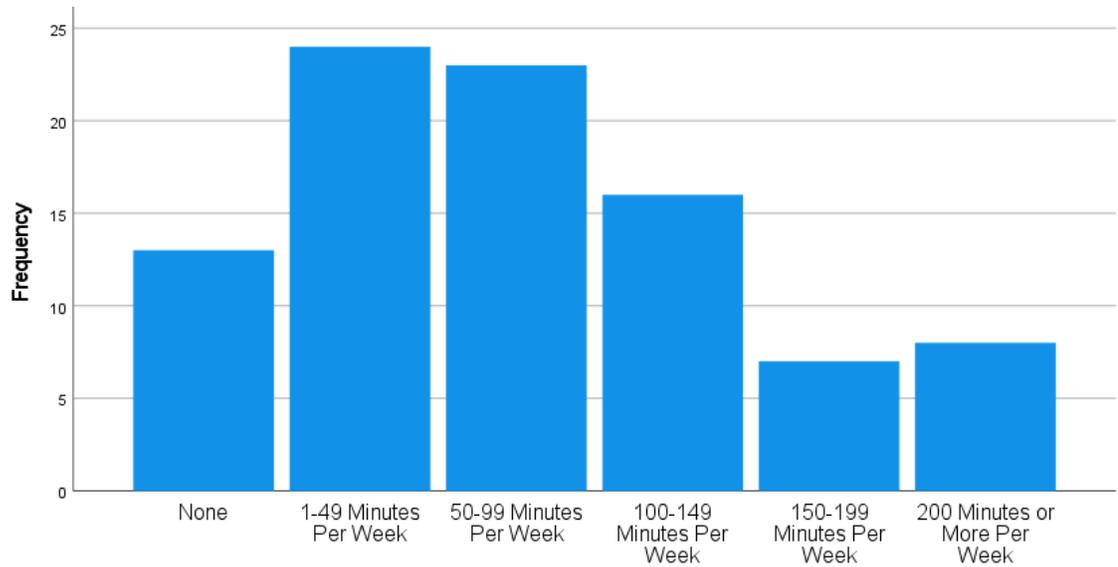


According to the responses collected, most participants engaged in PA on a regular basis before the COVID-19 pandemic.

The following question, as seen in figure 3, asked for PA levels in the time directly after the start of COVID-19. Of these responses, 13.4% indicated they did not participate in PA (n=13), 24.7% chose 1-49 minutes per week (n=24), 23.7% chose 50-99 minutes (n=23), 16.5% chose 100-149 minutes per week (n=16), 7.2% chose 150-199 minutes (n=7), and 8.2% chose 200 or more minutes per week (n=8). There were 6.2% of responses missing for this question (n=6).

Figure 3

Frequency of Responses to Question 9 Indicating Levels of Participants' PA in the Time Directly After the Start of COVID-19

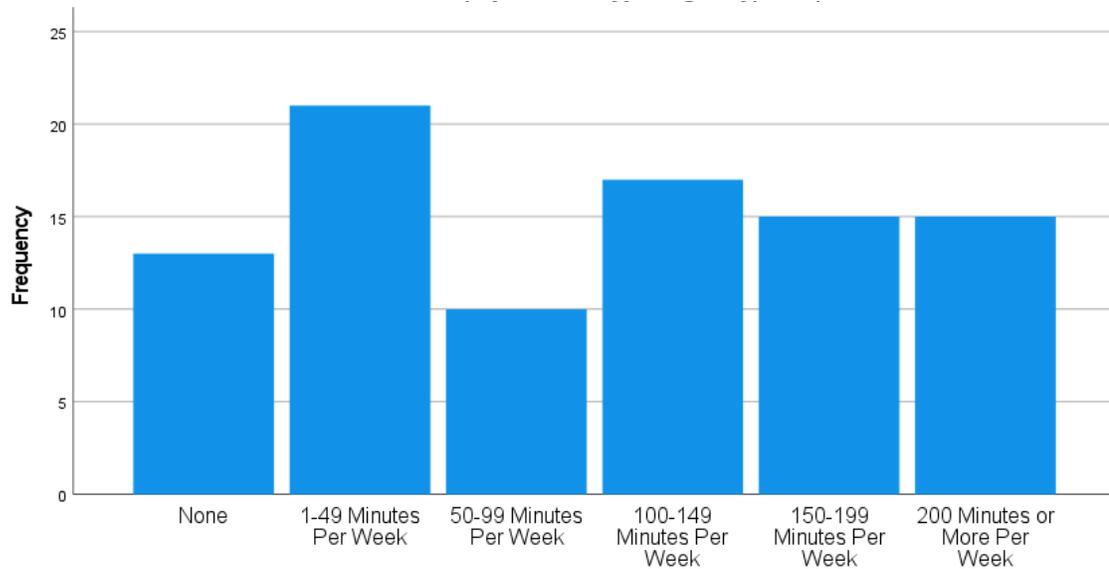


In the time directly after the start of the COVID-19 pandemic, the PA participation trends decrease among participants involved in this survey.

The tenth question, as seen in figure 4, asked for participants to indicate how much PA they currently participate in where 6.2% of responses were missing ($n=6$). The remaining responses were as follows: 13.4% do not currently participate in PA ($n=13$), 21.6% chose 1-49 minutes ($n=21$), 10.3% chose 50-99 minutes ($n=10$), 17.5% chose 100-149 minutes ($n=17$), 15.5% chose 150-199 minutes ($n=15$), and 15.5% chose 200 or more minutes per week ($n=15$).

Figure 4

Frequency of Responses to Question 10 Indicating Participants' Current Level of PA



Since the COVID-19 pandemic, many participants' levels of PA have recovered from the initial decrease due to the COVID-19 pandemic. Despite this improvement, PA participation has not fully recovered to levels pre-pandemic and many participants have not implemented a new PA routine since the disruption of the COVID-19 pandemic.

The survey went on to ask participants if they agreed that their type of PA changed because of COVID-19. The majority, being 78.4%, indicated that they agreed (n=76) while 14.4% did not agree (n=14) and 7.2% were missing responses (n=7). The 76 participants that indicated their type of PA was modified because of COVID-19 were given the next question asking which style of PA they participated in during COVID-19. Participants could choose multiple responses and their options included hiking, walking/running, at-home exercises, reliance on apps/social media, swimming, biking, kayaking/rowing, and other. The avenues of PA in order of most chosen to least is as

follows: at-home exercises, walking/running, hiking, reliance on apps/social media, biking, other, swimming, and kayaking/rowing being the least chosen.

The subsequent two questions were created to assess how students felt about the mandatory recreation fee charged to their student accounts during COVID-19 despite not having access to the recreation center. First, question 13 asked if the participant was an enrolled student during the occurrence of COVID-19 precautionary measures (i.e., mandatory mask mandates, public capacity limits). There were 89 responses to this question with 76.4% of the 89 responses indicating that they were enrolled at UNG during that time (n=68) and 23.6% indicating they were not enrolled (n=21). Those who were enrolled during COVID-19 precautionary measures were given a Likert 5-point scale asking if they felt it was unfair to be charged the mandatory recreation fee during this time. The results can be seen in Table 2 below.

Table 2

Summary for Likert scale on if recreation fee charges were unfair to be charged during COVID-19 based on the 68 responses to Question 14.

Participant Response	Percent	n=
Strongly Agree	47.1%	32
Agree	26.5%	18
Neutral	14.7%	10
Disagree	8.8%	6
Strongly Disagree	2.9%	2

Body Image Perceptions

The last section of the survey was created to answer the second research question, did the impact on college students’ PA during the COVID-19 pandemic subsequently influence their body image perceptions? The fifteenth question asked if participants agreed that their body image perceptions changed because of COVID-19. Over half (55.7%) of participants answered yes to this question (n=54). Of the remaining, 35.1% answered no (n=34) and 9.3% of responses were missing (n=9). Participants who answered yes were then directed to the final two questions and those who answered no were directed to the end of the survey with a thank you message. The succeeding question probed if the indicated change in body image perception was positive or negative. Participants were presented with a 5-point Likert scale to choose if they agreed that COVID-19 negatively impacted their body image perception, and the results can be seen in Table 3 below.

Table 3

Summary for Likert Scale on COVID-19 Having a Negative Impact on Participant’s Body Image Perception Based on the 52 Responses Collected for Question 16.

Participant Response	Percent	n=
Strongly Agree	23.1%	12
Agree	51.9%	27
Neutral	11.5%	6
Disagree	11.5%	6
Strongly Disagree	1.9%	1

Of the 52 responses collected for question 16, three-quarters (n=39) indicated that their body image perceptions were negatively impacted by the COVID-19 pandemic. The final question asked participants which options they feel resulted in a negative impact on their body image. Participants were allowed to choose multiple responses out of the following: lack of access to fitness facilities/equipment, more time spent on social media, lack of social support and community, other, and indicating that their body image was not negatively impacted. Results for this question can be found in table 4.

Table 4

Summary for participant responses to question 17 describing which option(s) they feel negatively impacted their body image perceptions during the COVID-19 pandemic

Participant Response	Percent	n=
Lack of access to fitness facilities/equipment	32.1	34
More time spent on social media	36.8	39
Lack of social support and community	17	18
Other	7.6	8
My body image has not been negatively impacted.	6.6	7

The response selections in order of most selected to the least are as follows: more time spent on social media, lack of access to fitness facilities/equipment, lack of social support and community, other and lastly the indication that their body image was not negatively impacted.

Discussion

The value of participation in PA is widely accepted in terms of improved health and research points to a positive correlation in body image perceptions of individuals who participate in PA (Shang et al., 2021). Continued studies may still need to be completed to assess the long-term impact that the COVID-19 pandemic has had on college students PA participation and body image perceptions. Most college students have access to campus recreation facilities during normal operating hours, however COVID-19 precautionary measures altered facility availability. Mask mandates, which were introduced at UNG, and on most campuses across the world may have also influenced the level of accessibility to these fitness facilities. The purpose of this study was to explore the impact that COVID-19 had on these two vital aspects of well-being for college students at UNG. This section will describe the general findings from the study and include recommendations for future research.

All the participants in this study were enrolled students at UNG during the spring semester of 2022. Most of the participants were female, between the ages of 18 and 21 years, and identified the Dahlonega as their primary campus while pursuing a Bachelor's degree. Just over half of the participants were second- and third-year college students. With this demographic information, it is known that over half of the participants were first year college students or seniors in secondary school applying to college when the COVID-19 pandemic precautionary measures began in the Spring of 2020. Because of this, it is reasonable to argue that these students had a unique experience as new and incoming college students. Considering all the colleges each major may be housed under

at UNG, nearly half of participants were housed under the health sciences and professions college with the second leading college being science and mathematics.

With COVID-19 impacting several aspects of everyday life, it is reasonable to question whether this is true for participation in PA. In this study, participants indicated their level of PA before COVID-19, in the time directly after, and at the time the survey was administered. According to the responses, PA in college students at UNG significantly decreased in the time directly after the start of COVID-19. There may be many explanations for this decrease including those stemming from the pandemic's precautionary measures. These may include but are not limited to a lack of access to fitness facilities and/or equipment, the instatement of mandatory mask mandates, and/or fear of illness for oneself or a loved one. Now being nearly two years past the start of the pandemic and having been weaned off most precautionary measures, PA levels in these students has nearly shown a complete rebound yet have not fully recovered to levels pre-pandemic.

Considering that the Physical Activity Guidelines for Americans recommends a minimum of either 150-300 minutes of moderate-intensity PA or 75-150 minutes of vigorous-intensity PA, it can be evaluated whether these students' levels of PA meet the recommendations (Piercy et al., 2018). Assuming the PA was moderate-intensity, 32.9% of students met 150 or more minutes per week as recommended (n=32). After the start of the pandemic, this plummeted to only 15.4% of students engaging in this amount of PA (n=15) and the levels are currently indicating that 31% of these students are meeting minimums now (n=30). It is more reasonable to assume that PA ranges between

moderate- and vigorous-intensity PA, therefore the percentage of students meeting recommendations would likely be more forgiving.

There has also been a rise in concern for the mental health and well-being of college students due to the social isolation and change to online classes. If college students' PA has decreased across the board, or had been negatively impacted during COVID-19, it would be refutable to deny that this decrease in PA has not also impacted their body image perceptions. Holistic mental health relies heavily on community and social interaction, which is yet another aspect of life altered because of the COVID-19 pandemic (Kawachi & Berkman, 2001). With a lack of social interaction and a lack of exercise, the body image perceptions of college students may have been predicted to decline during this time, especially when considering the significant correlation between exercise and body image (Shang et al., 2021). This study has found that the majority of the participants surveyed, equally three-quarters of the responses to question 16, did notice a declining body image perception.

Summary

The data from the survey revealed a change in college students' PA levels throughout the course of the COVID-19 pandemic. There was an initial decrease in PA levels directly following the beginning of COVID-19, which has improved but not fully recovered to self-reported pre-pandemic levels. The type of PA was also modified by many students during COVID-19 lockdowns by using avenues such as walking, running, hiking, kayaking, swimming, and biking that were not restricted to a singular brick and mortar facility. Reliance on at-home exercises, apps, and/or social media were other methods post-secondary students attempted to remain engaged in PA. A substantial

finding was that most students felt it was unfair to be charged the mandatory university recreation fee despite being unable to utilize the recreation center during lockdowns or when these amenities were operating at limited capacity. Due to the cumulation of the previously mentioned factors, many students witnessed a decline in their own body image perception. Some believed that the reasons for this were an increase of time spent behind a computer screen, lack of direct access previously relied upon fitness facilities, and the lack of a sense of community during this time period.

Recommendations for Future Research

The results of this study described a select demographic of college students enrolled at UNG but may not be a true representation of all college students at the UNG Dahlonega campus or other UNG affiliated location, or even be representative to all students across the state of Georgia for that matter. Future researchers should look to examine a larger and broader population of students in the University System of Georgia (USG) and other non-USG affiliated institutions to include a broader inclusion of ages, socioeconomic statuses, and academic majors. The inclusion of other universities in the USG could compare how students may have been uniquely impacted by the pandemic at their respective institutions even though they were subjected to the same mandates imposed by USG.

This survey produced a 95% confidence interval with a 10% margin of error (Raosoft, Inc., n.d.). A small number of participants is incapable of fully reflecting such a large population, revealing a need for future research to be conducted. To engage more participants and increase completion rates of the survey, researchers could incentivize or extend the time period over which the survey is available. Attributable to the time

constraints associated with an undergraduate thesis project, the researcher decided to conduct a descriptive cross-sectional survey rather than a cohort study (e.g., a longitudinal study). Future longitudinal studies would provide more information on the potential long-term impacts of COVID-19 on PA and body image perceptions.

Another recommendation would be to sample students with differing post-secondary student statuses. An undergraduate student may have been new to college and adjusting to the change in lifestyle at the start of the pandemic whereas a graduate student may have been holding a daytime job and/or other responsibilities during this time. Additionally, these students can be evaluated for their knowledge of the importance of PA and whether they use this information to encourage themselves to be more physically active.

Furthermore, future studies should evaluate the long-term impact of COVID-19 on college students physical, mental, and emotional well-being. With the decrease in PA levels and known link between PA and well-being related to body image and satisfaction, it may be possible that further psychological implications occur as well (Shang et al., 2021).

Limitations

There were several limitations within this study, all of which were outside of the researchers control. The first is that the researcher could not control nor predict how many students chose to participate and complete all aspects of the survey. There may have simply been a lack of motivation for students to participate without some sort of worthwhile compensation. Participants were also asked about their perceptions and activity levels from past times, occurring nearly two years before the survey. The

recollection of past events may have been altered through time. The honesty of participants responses while completing the Anderson Pandemic-Related Impacts Survey was another factor outside of the researcher's control.

Conclusion

The results from this study exposed the need to uphold and support the well-being of college students during this time. The mental and physical health of post-secondary students should be considered a public health concern and taken into consideration among universities. Educating students is a viable and accessible way to promote participation in PA for these students. While acknowledging the importance in sustaining not only a healthier physical well-being, but mental and emotional well-being as well, the knowledge can be offered for the benefit of the student. Universities may wish to seek cost-effective ways to expand access to fitness facilities, equipment, and classes which could be made more accessible through online fitness classes and trainings. Students may also benefit from enhanced awareness of the mental health resources provided through on-campus avenues that are already being funded through their student fees. Such ancillary resources may include but are not limited to: on-campus Therapy, counseling sessions, and 24/7 emergency mental health hotlines. These interventions, combined with the promotion of recommended PA, are vital to protect college students' current and future well-being as they navigate the unique challenges of completing a post-secondary education. Universities can elect to develop or enhance community partnerships to give students more access to affordable and healthier food options. By instituting these small changes on and off campuses, universities and post-secondary students may be better

prepared for future situations that may impact their PA levels or caloric intake due to factors outside of their control.

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Appendix A: Survey Instrument

Thesis

Start of Block: BLOCK 1

INTRO/DISCLAIMER

Title of the Study: Worse exercise habits and diminished body image perception in college students, is COVID-19 to blame?

Study Number:

Principal Investigator: Lois Jeanette Anderson, Kinesiology student

Faculty Advisor(s): Dr. Andrew Jakiel, Kinesiology, 706-867-3221,

Andrew.jakiel@ung.edu ; Dr. Stephen Smith, Psychology, 706-864-1890,

Stephen.smith@ung.edu ; Dr. Parker Hyde, Kinesiology, 706-867-2043,

parker.hyde@ung.edu

You have been asked to take part in a research study. This consent form describes the research study and give you information you need to know before deciding whether to take part. You may freely choose whether or not to take part in the study; participation is completely voluntary. At the end of the form we will ask you to confirm that you voluntarily agree to be part of this study.

Overview of Key Information

1. We will ask you to complete a short survey based on your personal experience with participation in physical activity and body image perceptions before, during, and after the COVID-19 pandemic.
2. The goal is to review the potential impact that COVID-19 had on college students physical activity as well as the influence that reduced physical activity has on body image perceptions.
3. The survey is approximated to take 5 minutes to complete.
4. We will not ask for information that could be used to tell who you are. This research is completely anonymous.
5. There is no more than minimal risk associated with this survey. Risk is the same as in everyday life.

What are you being asked to do?

You are being asked to participate in a survey research study entitled “Worse exercise habits and diminished body image perception in college students, is COVID-19 to blame?”. This study is being conducted by Lois Jeanette Anderson, an undergraduate student at the University of North Georgia, as part of her Honors Program thesis. The survey is expected to take approximately 5 minutes to complete. The survey will remain open for a period of four weeks.

Why is this research study being done?

The goal of this research study is to assess the impact that the COVID-19 pandemic had on college students' participation in physical activity and body image as compared to before the pandemic. We plan to have approximately 400 people take part in this study.

How will we use your private information?

The only demographic information we will ask for include your age, gender, post-secondary status and experience level, and which college your major is housed under at the University of North Georgia. We will not ask for your name or signature. In other words, the information you provide will be completely anonymous. No one, including the researcher, will be able to associate your responses with your identity.

In some cases, we may need to share the information you provide. The UNG Institutional Review Board makes sure that research with people is done ethically. They may review our records. State or federal laws or court orders may also require us to share information from the study records. All of the survey responses will be stored on a password-protected site, Qualtrics, if access to the information provided is required in the future.

What are the risks?

There are little to no risks associated with this study.

What are the benefits of being in this research study?

You will not benefit from this research study.

Society may benefit in the future because of what the researchers learn from this study.

This study may help to provide additional guidance for public health officials and fitness centers on appropriate steps to take in future events to allow for controlled access to fitness facilities.

Who can you contact if you have questions?

Questions regarding the purpose or procedures of the research should be directed to either the primary investigator, Lois Jeanette Anderson at ljande4102@ung.edu or her faculty research advisor, Andrew Jakiel at andrew.jakiel@ung.edu.

For questions about being a research participant, please contact the chair of the Institutional Review Board (irbchair@ung.edu) or the Assistance Director for Research Integrity, Dr. Troy Smith, 3820 Mundy Mill Road, Oakwood, GA 30566, 678-717-3670, troy.smith@ung.edu. For questions about being a research participant, please contact the chair of the Institutional Review Board (irbchair@ung.edu) or the Assistant Director for Research Integrity, Dr. Troy Smith, 3820 Mundy Mill Road, Oakwood, GA 30566, 678-717-3670, troy.smith@ung.edu.

What are your rights as a research study volunteer?

Your participation is voluntary. You may choose not to participate and/or to stop participating at any time. There is no penalty if you decide not to participate. The researcher may take you out of the study if you are under the age of 18 years old or not a currently enrolled student at the University of North Georgia.

Please confirm that you understand. By choosing the option "I consent" below, you are

agreeing with the following statement:

I have read this consent document. I have been able to ask any questions I have about the study. I have been able to tell the researcher about my concerns. The researcher has answered my questions and responded to my concerns. I believe that I understand the research study, the potential risks, and the potential benefits. I agree to participate in this study.

- I consent (1)
- I do not consent (2)

Skip To: End of Survey If Title of the Study: Worse exercise habits and diminished body image perception in college student... = I do not consent

End of Block: BLOCK 1

Start of Block: BLOCK 2

Q1 Are you a currently enrolled student at the University of North Georgia (UNG)?

- Yes (1)
- No (2)

End of Block: BLOCK 2

Start of Block: BLOCK 3

Q2 With which gender do you identify?

- Male (1)
 - Female (2)
 - Other (3)
 - Choose not to disclose (4)
-

Q3 Which age group best applies to you?

- 0-17 years old (1)
- 18-21 years old (4)
- 22-23 years old (5)
- 24-25 years old (2)
- 26 years or older (3)

End of Block: BLOCK 3

Start of Block: BLOCK 4

Q4 Identify your post-secondary student status.

- Certificate Program (1)
 - Undergraduate Associate (2)
 - Undergraduate Bachelors (3)
 - Graduate Student Masters (4)
 - Graduate Student Doctoral (5)
 - Not listed (6)
-

Q5 Which best describes your post-secondary experience level?

- First Year (1)
 - Second Year (2)
 - Third Year (3)
 - Fourth Year (4)
 - Fifth Year (5)
 - Sixth Year (6)
 - Not Listed (7)
-

Q6 On which UNG campus do you complete the majority of your coursework?

- Dahlonega (1)
 - Cumming (2)
 - Gainesville (3)
 - Oconee (4)
 - Blue Ridge (5)
-

Q7 Under which college is your declared major housed?

- College of Arts and Letters (1)
- College of Education (2)
- College of Health Sciences and Professions (3)
- Mike Cottrell College of Business (4)
- College of Science and Mathematics (5)
- University College (6)
- Undeclared (7)
- I don't know (8)

End of Block: BLOCK 4

Start of Block: BLOCK 5

Q8 Before the COVID-19 pandemic began, choose the amount of physical activity you regularly participated in.

- None (1)
 - 1-49 minutes per week (2)
 - 50-99 minutes per week (3)
 - 100-149 minutes per week (4)
 - 150-199 minutes per week (5)
 - 200 minutes or more per week (6)
-

Q9 During the time directly after the COVID-19 pandemic began, choose the amount of physical activity you regularly participated in.

- None (1)
 - 1-49 minutes per week (2)
 - 50-99 minutes per week (3)
 - 100-149 minutes per week (4)
 - 150-199 minutes per week (5)
 - 200 minutes or more per week (6)
-

Q10 Choose the amount of physical activity you regularly participate in currently.

- None (1)
- 1-49 minutes per week (2)
- 50-99 minutes per week (3)
- 100-149 minutes per week (4)
- 150-199 minutes per week (5)
- 200 minutes or more per week (6)

End of Block: BLOCK 5

Start of Block: BLOCK 6

Q11 Do you agree with the following statement?

I modified the type of physical activity I participated in during COVID-19 related lockdown.

Yes (1)

No (2)

End of Block: BLOCK 6

Start of Block: BLOCK 7

Q12 Since you answered yes to having modified your physical activity type during COVID-19 lockdown, what avenues of physical activity did you participate in that was different than before COVID-19 lockdown? (Check all that apply.)

Hiking (1)

Walking/Running (2)

At-home Exercises (3)

Reliance on apps/social media (4)

Swimming (5)

Biking (6)

Kayaking/Rowing (7)

Other (8)

End of Block: BLOCK 7

Start of Block: BLOCK 8

Q13 Were you an enrolled university student during COVID-19 precautionary measures (For example: mandatory mask mandate, public capacity limits, etc.)

- Yes (1)
- No (2)

End of Block: BLOCK 8

Start of Block: BLOCK 9

Q14 On a scale, how much do you agree with the following statement?

I feel that it was unfair to be charged for the Recreation Center fee during COVID-19 related limitations that may have caused the Recreation Center to be shut down or have capacity limits.

- Strongly Agree (1)
- Agree (2)
- Neutral (3)
- Disagree (4)
- Strongly Disagree (5)

End of Block: BLOCK 9

Start of Block: BLOCK 10

Q15 Do you agree with the following statement:
I feel my body image perceptions changed because of COVID-19.

- Yes (1)
- No (2)

End of Block: BLOCK 10

Start of Block: BLOCK 11

Q16 On a scale, how much do you agree with the following statement?

The COVID-19 pandemic has negatively impacted my body image perception.

- Strongly Agree (1)
 - Agree (2)
 - Neutral (3)
 - Disagree (4)
 - Strongly Disagree (5)
-

Q17 Which of the following do you feel have resulted in a negative impact on your body image perception? (Check all that apply.)

- Lack of access to fitness facilities/equipment (1)
- More time spent on social media (2)
- Lack of social support and community (3)
- Other (4)
- My body image has not been negatively impacted. (5)

End of Block: BLOCK 11

Appendix B: IRB Exemption Waiver

IRB Exempt Waiver
IRB Study Number: 2021-117
Decision Date: 12/08/2021

Lois Anderson
Department of Kinesiology

Project Title: Worse exercise habits and diminished body image perception in college students, is COVID-19 to blame?

Dear Anderson

Your IRB application 2021-117 entitled “Worse exercise habits and diminished body image perception in college students, is COVID-19 to blame?” has been evaluated in light of the federal, state, and institutional guidelines that govern the protection of human subjects. The proposed research has been deemed **EXEMPT** as defined by the Revised Common Rule 45 CFR 46.104(d)(2).

Although your project is exempt from continued IRB review, the research must adhere to the proposal submitted to the IRB. If changes to your study become necessary during the research project, you will need to submit a *Research Modification Request* form to the IRB and obtain IRB approval before implementation of those changes.

If an unanticipated problem and/or adverse event happens during your study, you must notify the IRB by submitting an *Unanticipated Problem Report*. Other actions also may be required depending on the nature of the incidence. For adverse events that directly impact the safety of research participants, you should also contact the IRB Chair directly.

Please note that although exempt protocols do not have an expiration date and do not require periodic continuing review by the IRB, we ask researchers to inform the IRB when a research project has been completed so that we can keep track of active research projects. Once you complete the study or if you decide to terminate your project prematurely please submit a *Notice of Research Closure/Termination* form to the IRB. The IRB may send you reminders as a courtesy, but it is your responsibility as the principal investigator to complete the research process by submitting the termination form.

Finally, please include the IRB study number denoted above in all your communication or correspondence related to your application and this letter. If you have any questions or need clarification of the contents of this letter, please contact me.

Good luck with your project!

Best,

A handwritten signature in black ink, appearing to read "S. Aikman".

Shelley N. Aikman, PhD
Professor, Psychological Science
IRB Chair
irbchair@ung.edu

Appendix C: Recruitment Flyer

PARTICIPANTS NEEDED FOR COVID-19 IMPACT SURVEY

Do you feel that COVID-19 has impacted your physical activity or body image perceptions?

**SCAN THE QR CODE OR
COPY THE LINK BELOW
TO PARTICIPATE IN THIS
RESEARCH PROJECT**



[HTTPS://UNG.CO1.QUALTRICS.COM/JFE/FORM/SV_8JM
TU16YO3JLH5C](https://ung.co1.qualtrics.com/jfe/form/sv_8JM_TU16YO3JLH5C)

THANK YOU FOR YOUR PARTICIPATION.